Bulletin of the Museum of Comparative Zoology
AT HARVARD COLLEGE
Vol. 110, No. 1

ZOOLOGICAL RESULTS OF A FIFTH EXPEDITION TO EAST AFRICA

I

MAMMALS FROM NYASALAND AND TETE.
With Notes on the Genus *Otomys*

By Barbara Lawrence and Arthur Loveridge

With Three Plates

CAMBRIDGE, MASS., U.S.A.
PRINTED FOR THE MUSEUM

June, 1953

No. 1 — *Zoological Results of a Fifth Expedition to East Africa*

I

Mammals from Nyasaland and Tete. With Notes on the Genus Otomys

By Barbara Lawrence and Arthur Loveridge

CONTENTS

INTRODUCTION

The collection on which the following report is based, was made by Arthur Loveridge while investigating the herpetofauna of the largely deforested mountains of Nyasaland. The enquiry was jointly financed by grants from the Penrose Fund of the American Philosophical Society, and from the Museum of Comparative Zoology on whose behalf it was carried out.

A synopsis of the itinerary is given in the caption accompanying Plate 1 — a map showing the position of the principal collecting localities. Altitudes and other information regarding the various camps will be furnished in the final report of this series which will deal with the general conclusions. However, it is as well to state here that camp in the Misuku Mountains was made beside the Matipa Forest; on the Nyika Plateau directly above Nchenachena at 7500 feet; on Mlanje Mountain at three different points, viz. Lichenya Plateau, the Likabula River in the western foothills, and the Ruo Valley on the southeastern slopes. Mtimbuka (Tembuka on labels) is on the southwest shore of Lake Nyasa about fourteen miles north of Fort Johnston. The locality figuring as "near Tete, M." in the following pages, is the village of Kasumbadedza on the south bank of the Zambezi River five miles west of Tete, Mozambique.

Tete (pronounced Tet, though spelled Tette by the earlier naturalists) was made famous as a type locality by Wilhelm Peters who, with a little help from other mammalogists, described no fewer than thirty mammals from there. It was in the hope of securing topotypical material that Loveridge visited the place, first settled by the Portuguese in 1531. Topotypical material of eleven Tete mammals was collected, besides topotypes of fifteen Nyasaland species; a further twenty animals described from Nyasaland were obtained there, though not in the precise type locality. Altogether, except for a shrew taken in Kenya on the outward voyage, and about 50 alcoholics, 550 skins representing 95 forms were preserved between July 29, 1948, and April 1, 1949; of these 41 are new to our collections.

Almost a dozen erroneous or vague type localities have been amended by Moreau, Hopkins and Hayman (1946); such are indicated by a reference to Moreau et al, whose paper will be found in the bibliography. Otherwise we follow G. M. Allen (1939) who replaced obsolete geographical names like Portuguese East Africa by their modern equivalent, in this instance Mozambique. Localities where material was collected during the course of Loveridge's expedition are arranged from North to South, not listed chronologically.

The taxonomic sections of the paper are by Barbara Lawrence. The field notes included under such headings as *Native names*, *Breeding*, *Diet*, *Parasites*, *Enemies*, *Measurements*, etc. are by Arthur Loveridge.

Colors in quotation marks are after Ridgway (1912). When measurements are given serially, they are always in the following order: (1) length from snout to anus; (2) length of tail without terminal hairs; (3) length of hind foot, which, unless otherwise stated, is measured without claws; occasionally in the discussion "c.u." is used meaning with claws, and "s.u." meaning without claws; (4) length of ear from tip to notch. In the case of bats a fifth measurement is added: (5) length of wing from axilla to tip. Where cranial measurements are not standard, they are described in detail in the text; "br." means not measured because the skull was broken. All dimensions are in millimetres, and, unless otherwise stated, those given are of the largest male and largest female of the series. Subadult specimens which are insufficiently mature to display adult characters are listed as "yng".

It was found necessary to describe as new, four forms, three of which were taken in Nyasaland, though the types of two are based on Tanganyika material collected during the course of an earlier safari. These four new forms are:

Steatomys pratensis nyasae from Likabula River, Mlanje Mtn., Nyasaland.

Dasymys incomtus alleni from Ilolo, Rungwe Mtn., Tanganyika Territory.

Otomys uzungwensis from Dabaga, Uzungwe Mtns., Tanganyika Territory.

Otomys barbouri from Kaburomi, Mount Elgon, Uganda.

ACKNOWLEDGEMENTS

We take this opportunity of thanking Dr. T. S. C. Morrison-Scott and Mr. R. N. Hayman of the British Museum (N.H.) for examining certain types; Messrs. C. W. Benson and Guy Muldoon of Nyasaland for donating some skins of species we might not otherwise have got. We are grateful to our colleague Dr. J. C. Bequaert for identifying some of the ectoparasites but unfortunately it has not been possible to get all groups done; also Dr. J. T. Lucker of the United States Department of Agriculture for similar courtesies regarding parasitic worms.

INDEX TO SPECIES COLLECTED

*Extraterritorial to the title of this paper.

SYSTEMATIC DISCUSSION
MACROSCELIDIDAE

Rhynchocyon cirnei cirnei Peters

Rhynchocyon cirnei Peters, 1847, Ber. über Verhandl. K. Preuss. Akad. Wiss. Berlin, p. 37, pl. iv, fig. 1: Quelimane, Boror District, Mozambique.

♀ (M.C.Z. 43738) Likabula River. 5.viii.48.

Native name. *Sakwi* (Nyanja).

Discussion. Allen & Loveridge's (1933, p. 53) careful comparison of the pattern in this and the following form, applies very well to the specimens at hand except that in this Likabula elephant shrew the chestnut spots are darker with the buffy spots more reduced, and the third lateral line has four or five ill-defined chestnut spots. The skull is too badly broken to show any cranial differences between the two forms except for the larger teeth in *cirnei* (M^1/–M^3/ 11.2 mm. in *cirnei* 10 mm. in *hendersoni*; width of M^1/ 4 mm. and 3.8 mm. respectively).

Size. ♀. 251. 220. 66. 29 mm.

Breeding. No embryos present, but on March 11, in Cholo Mtn. forest, two nests were found. One, constructed of leaves of which many were skeletonized, was placed against a rotting log lying on the forest floor; the other, which was twice the size of a football, had been built between two logs.

Enemies. This animal had been killed for food and was subsequently eaten by the Nyanja native who supplied the name, and denied that it was ever called *sakiwimbala* as its Nyanja name has been said to be elsewhere.

Rhynchocyon cirnei hendersoni Thomas

Rhynchocyon hendersoni Thomas, 1902, Ann. Mag. Nat. Hist. (7), **10**, p. 403: Plateau west of Lake Nyasa, [i.e. Nyika Plateau], Nyasaland (Moreau et al, 1946, p. 393).

1 ♀ (M.C.Z. 43736) Misuku Mtns. 27.ix.48.
2 ♂♂, 1 ♀ (M.C.Z. 43734–5, –7) Nyika Plateau. 3–5.xi.48.
2 ♂♂, 2 ♀♀ (M.C.Z. 43730–3) Vipya Plateau. 18.ix.48.

Native names. *Namitundi* (Yao); *ndamba* (Tonga); *tondo* (Ngoni).

Discussion. The specimens from the Nyika Plateau were secured

fifteen miles from the probable type locality; those from the Misuku Mtns. and Vipya Plateau match them closely.

Size. ♂ (M.C.Z. 43731), 280. 232. 67. 31 mm.; ♀ (M.C.Z. 43732), 265. 231. 61. 28 mm.

Breeding. Small embryos (preserved) were present in the ♀ obtained on September 27, but in no others.

Habits. While it was not unusual to hear these elephant shrews scratching aside the fallen leaves in search of insects, they were very timid and rarely exposed themselves. On one occasion in the Matipa Forest, however, my gunbearer, slashing a way through the undergrowth with his machete, was ascending the mountain side above me. I was some distance below him, engaged in searching beneath a log I had overturned, when an elephant shrew, doubtless disturbed by the gunbearer, came racing down the hillside so fast that the noise of its flying feet on the carpet of dead leaves made a single continuous rushing sound like that produced by a startled snake. Though the animal passed quite close to me and in full view for twenty feet, all I saw was a brown streak, the handsome cream-colored markings being quite indistinguishable.

One evening I was standing alone and unarmed in the forest when a scared shrew came rushing straight towards me. What had alarmed it I do not know, but it was within twelve feet before it caught sight of me, halted and froze. For a full minute the animal remained motionless, poised on its stiltlike legs, affording me an excellent opportunity of observing how wonderfully its blotches blended with the lights and shades of its surroundings. Then, so slowly and stealthily that no movement was obvious, it turned about and moved away six inches until hidden by some intervening stems of undergrowth, after which it bolted without further hesitation.

Petrodromus sp.

yng. ♂ (M.C.Z. 43913) Nchisi Mtn. 10.xii.48.

Native names. Sakwi zumbi (Chewa).

Discussion. This specimen is much too young for positive identification.

Size. ♂. 129. 88. 45. 27 mm.

Remarks. Taken alive in bathroom after a heavy downpour on previous day. Evidently it had entered through a water run-off hole.

Parasites. Ticks (*Ixodes* sp.) from chest preserved.

Nasilio brachyrhynchus fuscus (Peters)

Macroscelides fuscus Peters, 1852, Reise nach Mossambique, Säugeth., p. 87, pls. xix, xxii: Boror, Mozambique (Moreau et al, 1946, p. 391).

yng. ♀ (M.C.Z. 44086) Chitala River. 17.xii.48.
3 ♂♂, 5 ♀♀, 1 ? (M.C.Z. 43753–60, 44254) near Tete, M. 10–28.i.49.

Native names. *Azoro* (Nyungwe); *naliyeye* (Yao); *sakwi zumbi* (Chewa).

Discussion. In 1897 comparisons made by Thomas, Matschie and de Winton (and published by Thomas, 1897b, p. 928) led them to the conclusion that specimens from Boror, Tete and Nyika are the same form and further that Peters' *fuscus* was a synonym of *brachyrhynchus*. Since then Roberts has described five races, some of which intervene geographically between the type localities of *brachyrhynchus* and *fuscus*. It seems best, therefore, to revive Peters' name for the series at hand.

Size. ♂ (M.C.Z. 43757), 126. 115. 29. 21 mm.; ♀ (M.C.Z. 43755), 130. 125. 30. 22 mm.

Breeding. On January 10 a captive ♀ gave birth to a young one (68. 44. 23. 11 mm.) which was partially eaten during the night. On the 26th the largest ♀ held two embryos almost ready for birth, as were also two furred embryos on the 28th, of which one ♀ measured 64. 40. 21. 11 mm. All five were preserved in formaldehyde.

SORICIDAE

Suncus varilla minor Allen & Loveridge

Suncus varilla minor Allen & Loveridge, 1933, Bull. Mus. Comp. Zool., **75**, p. 57: Kitungulu, Urungu, Tanganyika Territory.

♀ (M.C.Z. 44102) Nyika Plateau. 28.x.48.

Discussion. In color, size, and dental pattern, this pigmy shrew resembles closely our type of *minor*. The former is an old animal, with remarkably worn teeth for a shrew; the latter is a young adult with teeth unworn. This difference in age may account for the longer fur and somewhat larger skull of the Nyika specimen which may also be somewhat intermediate towards typical *varilla*.

Size. ♀. 59. 32. 8. 8 mm.

Breeding. Four fetuses were preserved.

Habitat. Taken from a hole near my tent by our headman.

Sylvisorex sorella sorella (Thomas)

Myosorex (?) *sorella* Thomas, 1898, Proc. Zool. Soc. London for 1897, p. 930: Masuku Plateau [i.e. Misuku Mountains], Nyasaland.

♀ (M.C.Z. 44099) Misuku Mtns. 25.ix.48.

Discussion. The extraordinarily long tail and relatively large ears of this topotype of *sorella*, readily distinguish it externally from the other shrews of the area. The skull is too badly broken to show cranial characters.

Size. ♀. 70. 85. 13. 8 mm.

Crocidura occidentalis hera Dollman

Crocidura nyansae hera Dollman, 1915, Ann. Mag. Nat. Hist. (8), **15**, p. 571: Shiré Highlands, Blantyre District, Southern Nyasaland.

♀ (M.C.Z. 44255) Misuku Mtns. 15.x.48.
♀ (M.C.Z. 43739) Cholo Mtn. 19.iii.49.

Discussion. Although the specimen from the Misuku Mtns. is somewhat smaller and paler than the Cholo animal, there are no further differences to suggest anything but individual variation. Compared with specimens of *o. kivu* from the mountains north of Lake Nyasa, the Misuku animal is much paler and lacks the semi-aquatic pelage characteristic of *kivu*. The occurrence in the Misukus of the southern Nyasa race of *occidentalis* rather than the form found in the mountains of southern Tanganyika is interesting as in general Misuku animals tend to have northern, rather than southern, affinities.

Size. ♂ (M.C.Z. 43739), 137. 81. 19. 10 mm.

Breeding. Neither of these large shrews was pregnant.

Crocidura fumosa johnstoni Dollman

Crocidura fumosa johnstoni Dollman, 1915, Ann. Mag. Nat. Hist. (8), **15**, p. 510; and **16**, p. 372: Chiromo, Nyasaland.

♀ (M.C.Z. 44090) Nyika Plateau. 13.xi.48.
? ♀ (M.C.Z. 44100) Vipya Plateau. 18.ix.48.
♂ (M.C.Z. 44091) Chiradzulu Mtn. 28.viii.48.
1 ♂, 3 ♀ ♀ (M.C.Z. 43745-6, -50, -51) Cholo Mtn. 21.iii.49.

Native name. *Sonche* (Chewa; Manganja and Ngoni, but not specific).

Discussion. Externally, this race may be distinguished from *hirta*,

which occurs in the same area, by its much grayer color both dorsally and ventrally. Cranially, Dollman distinguishes the *fumosa* group from *hirta* and its allies on the basis of the size of the third unicuspid. In *fumosa*, this tooth is larger than the second unicuspid, while in *hirta*, the two are of about the same size. Certain other cranial details help to distinguish *fumosa johnstoni* from *hirta*. In *johnstoni*, the third upper molar is larger and has a well-developed V from the posterior corner of which a ridge runs to the postero-internal cusp; in *hirta* the V is lost so that the anterior part of the tooth is bladelike; both internal cusps are present but less well developed than in *johnstoni*. *C. f. johnstoni* may further be distinguished by the greater inflation of the pterygoid bone beneath and posterior to the hamular processes and the presence of a large round foramen on each side medial to the glenoid process.

Size. ♂ (M.C.Z. 43750), 90. 58. 15. 9 mm.; ♀ (M.C.Z. 43746), 95. 52. 15. 10 mm.

Remarks. The Cholo shrews formed part of a series of five brought in at sunset by a man who had obtained them rather lower down the mountain than the ridge where Loveridge personally collected the six *h. hirta*.

Crocidura beirae nyikae Dollman

Crocidura beirae nyikae Dollman, 1915, Ann. Mag. Nat. Hist. (8), **15**, p. 512; and **16**, p. 70: Nyika Plateau, Northern Nyasaland.

♂ ♀ (M.C.Z. 44092–3) Misuku Mtns. 23.ix–15.x.48.

Native name. Nungu (Misuku, applied to all shrews).

Discussion. No topotypes of this form were caught on the Nyika Plateau although three other species were found there. Dollman's good description of *beirae nyikae* fits the specimens at hand in every detail.

Crocidura hirta hirta Peters

Crocidura hirta Peters, 1852, Reise nach Mossambique, Säugeth., p. 78, pl. xviii, fig. 2: Tete, Mozambique.

♂ (M.C.Z. 44256) Mtimbuka. 9.ii.49.
3 ♂♂, 4 ♀♀ (M.C.Z. 43740–4, –47, –48) Cholo Mtn. 18–21.iii.49.
♀ (M.C.Z. 44088) Boroma, near Tete, M. 25.i.49.

Native names. Katolo (Yao); *sonche* (Manganja); *tsutsutsu* (Nyungwe).

Discussion. The Cholo Mountain series matches well the near topotype from the vicinity of Tete, which is also the type locality for *canescens* Peters and *annellata* Peters, which are synonyms.

Size. ♂ (M.C.Z. 43742), 104. 57. 14. 11 mm.; ♀ (M.C.Z. 43743), 98. 53. 15. 9 mm.

Habitat. The Mtimbuka shrew was hiding beneath a bundle of thatching grass leaning against a baobab, up which it ran; several of the Cholo animals were under a great pile of rotting grass; the Boroma specimen was found at the base of a stand of bananas.

Crocidura hirta suahelae Heller

Crocidura suahelae Heller, 1912, Smithsonian Misc. Coll., **60**, no. 12, p. 4: Mazeras, Kenya Colony.

♀ (M.C.Z. 44087) Changamwe, near Mombasa, K.C. 5.vii.48.

Discussion. This single specimen from near the type locality of *suahelae* is tentatively identified as that form on the basis of its slightly larger size and heavier unicuspids as compared with a series of *relutina* from Tanga. These differences are at best but small and on the basis of color alone the two are indistinguishable.

Size. ♀. 100. 35. 15. 13 mm.

Breeding. Four fetuses were preserved.

Crocidura hildegardeae hildegardeae Thomas

Crocidura hildegardeae Thomas, 1904, Ann. Mag. Nat. Hist. (7), **14**, p 240: Fort Hall, Kenya Colony.

1 ♂, 2 ♀ ♀ (M.C.Z. 44089, –94, –95) Nyika Plateau. 12–15.xi.48.
♂ (M.C.Z. 44101) Vipya Plateau. 18.ix.48.
♀ (M.C.Z. 44096) Nchisi Mtn. 9.xii.48.
♂ (M.C.Z. 44098) Lichenya Plateau. 14.vii.48.

Native name. Sonchi (Chewa; Ngoni).

Discussion. None of this scattering of examples from the whole length of Nyasaland differs in any significant way from the typical form. Apparently, as previous authors have pointed out, typical *hildegardeae* is a widespread and common race. The flattening of the skull, used by Dollman (1915b, p. 515) as a key character to separate this group from *jacksoni* and its relatives, is not a consistently good character in our series; otherwise the specimens fit well into his grouping.

Size. ♂ (M.C.Z. 44095), 74. 54. 12. 10 mm.; ♀ (M.C.Z. 44094), 71. 48. 12. 12 mm.

Breeding. On September 9, and November 16, each of two ♀ ♀ held four fetuses (preserved). It was noted that the four nipples were arranged in a chevron-shaped formation.

Diet. Shrews on the Nyika, probably assisted by *Lophuromys*, were a nuisance, nightly destroying at least two of our trapped rodents.

Enemies. A shrew, presumably this species, was recovered from the stomach of a Hissing Sand-snake (*Psammophis s. sibilans*) at Nchenachena on 19.xi.48. Its skull, together with another from Nchisi and one from Mlanje, were preserved in addition to those accompanying the skins listed above.

Habitat. The Nchisi ♀, together with a companion which escaped, was found beneath dead leaves that had drifted between the buttress roots of a giant tree in the heart of the forest.

PTEROPIDAE

Eidolon helvum helvum Kerr

Vespertilio, vampyrus helvus Kerr, 1792, in Linné, Animal Kingdom, **1**, pt. 1, pp. xvii, 91: No locality.

♂ (M.C.Z. 43761) Ruo R., Mlanje Mtn. 1.iv.49.

Size. ♂. 193. 18. 33. 30. 350 mm.

Remarks. Brought in by native. This eastern fruit bat was already recorded from Nyasaland.

Rousettus leachii (Smith)

Pteropus leachii A. Smith, 1829, Zool. Journ., **4**, p. 433: "Gardens about Cape Town," South Africa.

♂ (M.C.Z. 43833) Likabula River. 3.viii.48.

Native name. Karuru (Chewa).

Size. ♂. 155. 24. 23. 20. 310 mm.

Epomophorus ?crypturus (Peters)

Epomophorus crypturus Peters, 1852, Reise nach Mossambique, Säugeth., p. 26, pl. v; pl. xiii, figs. 1–6: Tete, Mozambique.

♀ (M.C.Z. 43762) Ruo R., Mlanje Mtn. 1.iv.49.

Native name. Mleme (Nyanja).

Discussion. It is possible that this is really *E. wahlbergi* which closely resembles *crypturus* and often occurs with it. As the palatal ridges are gone and the wing structure is difficult to see in this dried skin, we have relied for identification on the faintly grayish patches on the throat and belly. These pale spots are said never to occur in *wahlbergi* and only occasionally in *crypturus*.

Size. ♀. 132. 0. 18. 24. 260 mm.

Epomophorus labiatus minor Dobson

Epomophorus minor Dobson, 1880, Proc. Zool. Soc. London for 1879, p. 715: Zanzibar.

♂ (M.C.Z. 43763) Kausi, L. Malombe. 25.ii.49.

Native name. Lichinji (Yao, but applied to all large bats).

Discussion. This is the first record of *minor* from Nyasaland and constitutes an interesting southern extension of its known range.

Size. ♂. 112. 0. 14. 17. 205 mm.

Habitat. Found hanging in a large clump of bananas.

EMBALLONURIDAE

Taphozous mauritianus mauritianus Geoffroy

Taphozous mauritianus E. Geoffroy, 1818, Description de l'Egypte, **2**, p. 127: Mauritius Island.

♂ (M.C.Z. 43769) near Tete, M. 15.i.49.

Size. ♂. 90. 20. 8. 20. 200 mm.

NYCTERIDAE

Nycteris aethiopica oriana Kershaw

Nycteris oriana Kershaw, 1922, Ann. Mag. Nat. Hist. (9), **10**, p. 179: Chiromo, Shire Valley, Nyasaland.

♂ (M.C.Z. 43834) Chitala River. 21.xii.48.

Discussion. We have followed Allen & Loveridge (1942, p. 161) in considering *oriana* to be only subspecifically distinct from *aethiopica*. Externally, except for its shorter fur, the Chitala animal matches closely Kershaw's description of *oriana*. The large teeth ($C^1/ - M^3/$ 7.8 mm. in our specimen) are also characteristic of this form, but our bat differs from the type in having $P/_3$ only partly crowded out of line so that $P/_4$ and $M/_1$ are separated by a distinct, though small, space.

As the skull is badly broken, other cranial characters are hard to see, although the interorbital shield appears to have been broad as in *oriana*.

Remarks. Struck down when flying around the lighted lounge of Mr. W. T. Miller's house at the Cotton Growers' Experimental Station, Salima District.

Nycteris capensis Smith

Nycteris capensis A. Smith, 1829, Zool. Journ., **4**, p. 434: Interior of South Africa.

♂ (M.C.Z. 43767) Mtimbuka. 28.ii.49.

Native name. *Liputiputi* (Yao, but applied to all small bats).

Discussion. This young adult ♂, although somewhat grayer than is typical, undoubtedly belongs to this form of which Kershaw (1922, p. 178) reports ten specimens from Chiromo.

Size. ♂. 52. 57. 11. 33. 135 mm.

RHINOLOPHIDAE

Rhinolophus hildebrandtii hildebrandtii Peters

Rhinolophus hildebrandtii Peters, 1878, Monatsb. K. Preuss. Akad. Wiss. Berlin, p. 195, pl. i, figs. 1–1a: Ndi, Taita, Kenya Colony.

3 ♀ ♀ (M.C.Z. 43764–6) Mtimbuka. 16.ii.–4.iii.49.

Native name. *Lichinji* (Yao, but applied to all largish bats).

Discussion. These three horseshoe bats, all taken in the same place, show considerable variation. The youngest, with a forearm measurement of 59 mm. as against 62 mm. in the others, has the longest tooth row, 10 mm. as against 9.5 and 9.6 mm. Further, the nasal swellings in this young adult are conspicuously higher and broader than in the other two. In color the three specimens vary from smokey brown in the youngest, to reddish brown in the oldest animal.

Size. ♀. 78. 35. 15. 33. 190 mm.

Rhinolophus empusa Andersen

Rhinolophus empusa K. Andersen, 1904, Ann. Mag. Nat. Hist. (7), **14**, p. 378: Zomba, Nyasaland.

♂ (M.C.Z. 43782) Cholo Mtn. 18.iii.49.

Discussion. This interesting little bat matches perfectly Andersen's careful description except that the tip of the tail does not project beyond the edge of the interfemoral membrane.

Size. ♂. 50. 25. 6. 18. 140 mm.

HIPPOSIDERIDAE

Hipposideros caffer caffer (Sundevall)

Rhinolophus caffer Sundevall, 1846, Öfversigt af Kongl. Svenska Vet.-Akad. Förhandl. (Stockholm), **3**, no. 4, p. 118: near Port Natal.

Phyllorhina gracilis Peters, 1852, Reise nach Mossambique, Säugeth., p. 36, pl. vii, figs. 1–4; pl. xiii, figs. 14–15: Tete, Mozambique.

3 ♀ ♀ (M.C.Z. 43776–8) Mtimbuka. 18.ii.–4.iii.49.
♂ (M.C.Z. 43774) near Tete, M. 20.i.49.

Native name. Kalemawalema (Nyungwe, but not specific).

Discussion. All are in the gray phase; dorsally the dark bases of the tricolored fur are much reduced.

Size. ♂ (M.C.Z. 43774), 50. 30. 5. 16. 130 mm.; ♀ (M.C.Z. 43776), 55. 30. 7. 13. 140 mm.

Parasites. Two yellow-orange eggs were present on the right forewing of one Mtimbuka bat and a nycteribid was preserved from the fur of another.

Habits. All three ♀ ♀ were netted as they flew to and fro on the veranda in front of a lighted window.

Hipposideros ruber (Noack)

Phyllorhina rubra Noack, 1893, Zool. Jahrb., Syst., **7**, p. 586, pl. xviii, figs. 14–15: "Lugerrunjere Fluss," Tanganyika Territory (= Ngerengere River, probably near Ngerengere Village, 32 miles east of Morogoro on the old Bagamoyo–Tabora caravan route. See Swynnerton, 1945, p. 69).

♀ (M.C.Z. 43779) Mtimbuka. 15.ii.49.

Discussion. Externally this specimen differs from the examples of *caffer*, taken at the same place, by its larger feet, longer forearm and, dorsally, the longer dark bases of the tricolor fur. Cranially the much larger skull of *ruber* readily distinguishes the two.

Size. ♀. 52. 34. 7. 14. 150 mm.

Habits. Netted under same circumstances as *caffer*.

VESPERTILIONIDAE

Pipistrellus nanus nanus (Peters)

Vespertilio nanus Peters, 1852, Reise nach Mossambique, Säugeth., p. 63, pl. xvi, fig. 2: Inhambane, Mozambique.

6 ♀ ♀ (M.C.Z. 43841–6) Misuku Mtns. 25.ix.48.
2 ♂ ♂ (M.C.Z. 43775, 43780) Mtimbuka. 25.ii.–1.iii.49.
1 ♂, 5 ♀ ♀ (M.C.Z. 43835–40) Zomba Plateau. 3.ix.48.
♂ (M.C.Z. 43781) Cholo Mtn. 21.iii.49.
2 ♂ ♂, 3 ♀ ♀ (M.C.Z. 43847–51) Likabula R. 29.vii.48.

Native names. Chuchu (Manganja); *kashusha* (Misuku); *ndemia* (Chewa); *liputiputi* (Yao, but applied to all small bats).

Discussion. Specimens from southern Nyasaland undoubtedly approach Peters' animal very closely, averaging slightly paler than examples from the Misukus and mountains to the north of Lake Nyasa; these in turn average paler than Kenya specimens. East African banana bats are usually all referred to typical *nanus* and by far the greatest number of individuals are indistinguishable from one another. However, the darkest of the Kenya bats are darker with more coppery brown tips to their fur than any of the southern Nyasaland animals, and the palest of the latter are paler with more yellowish brown tips to the fur than any of the Kenya specimens.

Size. ♂ (M.C.Z. 43847), 43. 35. 5. 11. 98 mm.; ♀ (M.C.Z. 43839), 44. 40. 5. 11. 104 mm.

Breeding. On September 25, two ♀ ♀ each held two embryos.

Habits. At Mtimbuka, netted while flying with *Nycteris* and *Hipposideros* to and fro along a veranda in front of a lighted window.

Scotophilus nigrita dingaanii (Smith)

Vespertilio Dingaanii A. Smith, 1833, S. Afr. Quart. Journ., **2**, p. 59: (60 miles east of Natal, *fide* A. Smith, 1836, Illus. Zool. S. Afr.).

♂ (M.C.Z. 43768) Fort Johnston. 16.ii.49.

Discussion. We have followed Thomas & Wroughton (1908, p. 538) and Kershaw (1922, p. 182) in considering *Nycticejus planirostris* Peters, 1852, from Tete, to be synonymous with *dingaanii*.

Size. ♂. 85. 56. 10. 17. 180 mm.

MOLOSSIDAE

Chaerephon limbatus (Peters)

Dysopes limbatus Peters, 1852, Reise nach Mossambique, Säugeth., p. 56, pl. xiv: Mozambique Island (restricted by Moreau et al, 1946, p. 400).

3 ♂♂, 7 ♀♀, 1 ? (M.C.Z. 42852–62) Chitala R. 14.xii.48.
1 ♂, 3 ♀♀ (M.C.Z. 43770–3) near Tete, M. 25.i.49.

Native name. *Kalemawalema* (Nyungwe, but not specific).

Discussion. Peters' description was based on specimens from Sena, which is not far from Tete, as well as on examples from Mozambique Island. The form appears to be widespread and fairly uniform. Cranially as well as in external dimensions, our Tete bats are indistinguishable from those in the Chitala series. In color the extremes of the Chitala series have the tips of the dorsal fur slightly browner than in the Tete animals.

Size. ♂ (M.C.Z. 43860), 60. 37. 8. 18. 130 mm.; ♀ (M.C.Z. 43770), 63. 35. 7. 17. 123 mm.

Breeding. Two of the three Tete ♀♀ held large embryos (preserved) almost ready for parturition.

Trapping. At Chitala River, in addition to the 11 skins listed above, 27 bats were preserved in alcohol. These were obtained by means of a simple type of trap that was being employed about the buildings of the Empire Cotton Growers' Association to rid them of free-tailed bats, the stench of whose guano is liable to render houses uninhabitable. At one house, I was told, 44 bats were captured the first night and a total of 140 in the three weeks that it took to clear the place.

The effectiveness of the trap is based on the known fact that these animals cannot take to the air without a certain amount of leeway in which to spread their wings. All that one requires is a long triple-forked pole and a five-gallon gasoline can. From the latter a side must be cut away, and with this open side uppermost the can is inserted in the fork of the pole. The pole is then raised and wedged against the guttering, or eaves, of a building immediately below the aperture from which the bats have been observed to emerge at sundown. As they leave the building the bats launch themselves into the receptacle up whose slippery sides they cannot climb. At the Experimental Station it was routine practice to set up these traps around any building where the animals were becoming obnoxious.

CANIDAE

Thos adustus adustus (Sundevall)

Canis adustus Sundevall, 1846, Öfversigt af Kongl. Svenska Vet.-Akad. Förhandl. (Stockholm), **3**, no. 4, p. 121: In Caffraria interiore.

1 yng. ♂, 2 yng. ♀ ♀ (M.C.Z. 44157–9) Misuku Mtns. 27.ix & 5.x.48.
♂, ♀ (M.C.Z. 44289–90) Nyika Plateau. 9–10.xi.48.

Native names. *Ukambwe* (Misuku); *kandwe* (Nyungwe).

Discussion. The two adults clearly belong to the typical form rather than to the more northern white-bellied race *notatus* which has been recorded from Tanganyika Territory. The three young are not old enough for positive identification although they probably should be attributed to this species.

Size. ♂. 800. 360. 165. 90 mm.; ♀. 840. 370. 157. 88 mm.; the ♂ and ♀ cubs were from the same litter and both measured 300. 125. 65. 36 mm.

Diet. Fur of a blesmol (*Heliophobius a. angonicus*) present in stomach of one Nyika jackal. The pups were ravenous, taking milk, bread-and-milk, boiled rice in milk, and finally raw minced meat. They had to be fed every four hours until midnight, after which they would sleep until roused by the predawn hooting of an owl or the shrill squeaking of homing bats. Eventually they were chloroformed.

Parasites. A tick (*Haemaphysalis leachi*) was preserved from the Nyika ♀.

MUSTELIDAE

Aonyx capensis capensis (Schinz)

Lutra capensis Schinz, 1821, in Cuvier, Thierreich, **1**, p. 214: Cape Colony.

Skin only (M.C.Z. 44288) Nswadzi River, Cholo District.

Remarks. Bought from a native on 18.iii.49.

VIVERRIDAE

Civettictis civetta schwarzi Cabrera

Civettictis civetta schwarzi Cabrera, 1929, Mem. Real Soc. Espānola Hist. Nat. Madrid, **16**, p. 36: Zanzibar (selected by Schwarz, 1934).

Skin only (M.C.Z. 44287) Degwe, *ca.* 10 miles S.W. of Tete, M.

Native names. *Sere* (Nyungwe); *ungo* (Yao).

Remarks. Purchased from a native on 24.i.49.

Genetta tigrina mossambica Matschie

Genetta mossambica Matschie, 1902, Ver. d. V. Internat. Congress (Berlin, 1901), p. 1138: Mossimboa, Mozambique (restricted by Moreau et al, 1946, p. 409).

1 ♂, 1 yng. ♂ (M.C.Z. 44280–1) Mtimbuka. 9–14.ii.49.
♂ (M.C.Z. 44282) near Tete, M. 26.i.49.

Native names. *Mwili* (Nyungwe); *ndendu* (Yao).

Discussion. The great individual variation in coat color found in the species *tigrina*, has been described in some detail for the race *stuhlmanni* (Allen & Lawrence, 1936, p. 61). These adults of *mossambica* show a similar, though less extreme, variation, with the older individual from Tete being considerably paler than the young adult from near Fort Johnston. Both agree in differing from *stuhlmanni* in the slightly paler color of the cheeks and insides of the thighs, and in the sprinkling of white-tipped hairs ventrally on the black rings and tip of the tail. Cranially, *mossambica* is distinguished by its large skull with longer tooth rows and bigger individual teeth, particularly premolars.

Size. ♂ (M.C.Z. 44280), 550. 510. 95. 54 mm.; ♂ juv., 225. 190. 50. 33 mm.

Diet. The stomach of the Tete genet held the remains of a rare burrowing snake (*Prosymna lineata*), a large yellow scorpion (*Buthus trilineatus*) and some orthoptera. That of the Mtimbuka adult was *full* of flesh taken from the carcass of a baboon tethered outside my window.

Parasites. The kitten was swarming with larval ticks (*Haemaphysalis leachi*), some from the tail of the Mtimbuka ♂ were also preserved. The feces of the Tete genet, defecated after death, were alive with small cestodes which were preserved.

Habitat. The Tete genet was shot about 7:00 A.M. on a cloudy morning as it lay curled up beside a hole high on the trunk of a great baobab. The Mtimbuka specimen was obtained about midnight when I shone its eyes in the top of a tall acacia where I was looking for galagos.

Nandinia binotata gerrardi Thomas

Nandinia gerrardi Thomas, 1893, Ann. Mag. Nat. Hist. (6), **12**, p. 205: Lower Shiré River, Nyasaland.

Remarks. Two skins, taken in the Matipa Forest, Misuku Mountains, were shown to Loveridge by an old man on 24.ix.48. The record links that of the type locality with those from Rungwe and the Ukinga Mountains recorded as *arborea* (Allen & Loveridge, 1933, p. 75).

Native name. Njule. (Misuku).

Myonax cauui cauui (Smith)

Ichneumon cauui A. Smith, 1836, Report Exped. for Exploring Central Africa, app., p. 42: Kurrichane, northwestern Transvaal.

♀ (M.C.Z. 44138) Misuku Mtns. 7.x.48.

Native name. Kasera (Misuku).

Discussion. Myonax c. cauui, of which *ornatus* Peters from Tete is a synonym, is a widespread and rather variable form. The species is chiefly South African so that the occurrence of the typical form in the extreme north of Nyasaland is of particular interest. Of the various races described by Roberts, the one closest geographically to the Misuku Mtns. is *lancasteri*, from which our specimen differs in having the chestnut patch restricted to the head and nape instead of extending in a broad band to the base of the tail as well as having the annulated hairs of the back extend less far down on the sides. Compared with the *sanguineus* group, *cauui* may readily be distinguished by its smaller size and chestnut cap.

Size. ♀. 270. 210. 47. 26 mm.

Diet. Stomach held the remains of a grasshopper and what was apparently a mouse.

Parasites. Nematodes (*Travassospiura dentata*) present in stomach.

Enemies. The body was eaten by Zacheyo, our Ngoni wood and water man.

Myonax ratlamuchi auratus (Thomas & Wroughton)

Mungos auratus Thomas & Wroughton, 1908, Proc. Zool. Soc. London, p. 543: Tete, Mozambique.

♀ (M.C.Z. 44153) near Tete, M. 14.i.49.

Native name. Linkoli (Nyungwe).

Discussion. Both externally and cranially this topotype matches closely Thomas and Wroughton's description.

Size. ♀. 340. 280. 61. 25 mm.

Remarks. No fetuses; stomach empty; brought in by native boy.

Myonax sanguineus zombae (Wroughton)

Mungos melanurus zombae Wroughton, 1907, Ann. Mag. Nat. Hist. (7), **20**, p. 115: Zomba, Nyasaland.

♂ (M.C.Z. 44139) Cholo Mtn. 14.iii.49.

Native name. *Nyenga* (Yao, for one seen crossing the road at Mtimbuka).

Discussion. Except for its slightly larger size, both cranially and externally, this Cholo animal matches closely Wroughton's rather brief description. The strong resemblance between this specimen and the more northern races of *sanguineus*, including particularly the reddish form *rufescens* (Lorenz) from Zanzibar, reinforces G. M. Allen's opinion (1939, p. 225) that the *melanurus* group is not more than subspecifically distinct from the *sanguineus* group.

Size. ♂. 320. 260. 57. 26 mm.

Rhynchogale sp.

Skin only (M.C.Z. 44316) Mwera Hill, near Nchisi Mtn.

Discussion. Unfortunately the skull of this interesting specimen is missing so positive identification is difficult. In general color it looks much like a small, white-tailed *Ichneumia albicauda* but in details of nose and feet it differs conspicuously. The combination of no naked groove across the hairy upper lip below the rhinarium and five toes on both fore and hind feet ally it to *Rhynchogale* of which both known forms have dark tails. This feature, being variable in races of *Ichneumia*, may also vary in this little known genus. The broad, rather heavy feet and hairy heels of the specimen at hand are like those of *Bdeogale* from which it differs in the number of toes. Of these the first front toe, though small, is readily apparent, the first hind toe is minute.

Mr. R. W. Hayman has kindly compared the skin with specimens in the British Museum and agrees that it is very likely a *Rhynchogale*, stating further, "it is of course, in its white tail and smaller size, quite unlike *R. melleri*,... It agrees fairly well in colour and character of body hair with *R. caniceps* Kershaw, but is smaller than the type and only specimen we have of that, and *caniceps* again has a blackish tail like *melleri*."

FELIDAE

Caracal caracal limpopoensis (Roberts)

Lynx caracal limpopoensis Roberts, 1926, Ann. Transvaal Mus., **11**, p. 248: Njellele River, north of Zoutpansberg, near Limpopo River, northern Transvaal.

Skin only (M.C.Z. 44286) Katumbi area.

Discussion. This native skin without skull agrees with Roberts' description in being paler than typical *caracal* and in displaying a conspicuous stripe of dark-tipped hairs down the dorsal surface of the tail.

Remarks. This skin from Katumbi, Nyasaland, near the Nyasaland-Northern Rhodesia border, was purchased in April, 1947, by Mr. C. W. Benson who kindly presented it to the Museum. The record is of particular interest on account of the oft-repeated statement made by Sir Harry Johnston (1897, p. 285) that the lynx does not occur in Nyasaland.

Felis serval beirae Wroughton

Felis capensis beirae Wroughton, 1910, Ann. Mag. Nat. Hist. (8), **5**, p. 206: Beira, Mozambique.

Skin only (M.C.Z. 44284) Malala, west of Tete, M.

Native name. Chombwe (Nyungwe).

Discussion. Compared with Wroughton's description of the type, this skin agrees in color and in the manner in which the dorsal stripes are broken up. It differs in having the lateral spots somewhat larger and more elongated.

Felis lybica mellandi Schwann

Felis ocreata mellandi Schwann, 1904, Ann. Mag. Nat. Hist. (7), **13**, p. 423: Mpika, northeastern Rhodesia.

♀ (M.C.Z. 44285) Nchisi Mtn. 26.xi.48.

Native name. Vumbwi (Chewa).

Discussion. Pocock (1944, p. 131) notes that Schwann's original description is misleading and redescribes the type as follows: "upper side . . . dark grey, owing to the black and white speckling of the contour hairs; the blackened spinal area has dull buff speckling; the lower side is ochraceous buff diluted by the long whitish tips to the

hairs; the ears and nose are mainly rusty ochreous and the cheeks are buff, contrasted with the white chin." He adds that the forelegs are distinctly and normally striped. Our specimen from Nchisi agrees closely with this account; the rather pale color and sharply contrasting rusty ochreous ears are its most conspicuous feature.

Size. ♀. 575. 320. 132. 62 mm.

Parasites. One nymphal tick preserved.

Habitat. Shot on road about midnight.

Felis pardus ?pardus Linné

Felis Pardus Linné, 1758, Syst. Nat., ed. 10, **1**, p. 41: "In Indiis," but designated by Thomas (1911) as Egypt.

Skull only (M.C.Z. 44283) Chiradzulu Mtn. 26.viii.48.

Native names. Kimbwe (Misuku); *kizui* (Yao); *nyarubwe* (Chewa).

Discussion. Pocock (1932, p. 590) synonymizes the East African leopard *suahelica* with *p. fusca,* the Bengal leopard, and includes Nyasaland in its range. However, as pointed out by Allen & Loveridge (1933, p. 81), the range of typical *pardus* intervenes between the ranges of the East African and Indian forms. It seems best, therefore, to refer the Nyasaland form to *pardus* until further evidence is forthcoming to establish *suahelica* as a distinct race.

Remarks. This skull was prepared from the head of a halfgrown leopard found lying on the path near the summit of the mountain. Mr. W. H. J. Rangeley thought that the animal had been bitten in the neck and killed by an older leopard. Leopards are still numerous in Nyasaland and were either heard, disturbed, or signs of them encountered, at almost every camp made during the nine months.

LORISIDAE

Galago crassicaudatus crassicaudatus Geoffroy

Galago crassicaudatus E. Geoffroy, 1812, Ann. Mus. d'Hist. Nat. (Paris), **19**, p. 166: No locality given, but fixed by Thomas (1917) as Quelimane, Mozambique.

2 ♀♀ (M.C.Z. 44135–6) Mtimbuka. 9–10.ii.49.

Native name. Likomba (Yao).

Discussion. These are clearly typical *crassicaudatus,* although they differ from Schwarz's (1931, p. 44) description of this form in having the hands darker than the arms.

Size. ♀. 320. 400. 35. 68 mm.

Breeding. No sign of a fetus in either animal.

Remarks. The extremely raucous call of this species seemed quite unlike my recollections of the cry of *G. c. panganiensis*. Disturbed by their noisy cries I went outside at 11.40 P.M. and shone the eyes of a pair of galagos in the top of an acacia in the garden. Another night two were located in an *Hyphaene* palm, where they probably spent the day.

Galago senegalensis nyasae Elliot

Galago nyasae Elliot, 1907, Ann. Mag. Nat. Hist. (7), **20**, p. 188: Mountains south of Lake Nyasa, Central Africa (Moreau et al, 1946, p. 401).

♂ (M.C.Z. 44134) Cholo Mtn. 21.iii.49.

Discussion. Based on an examination of the type only, Schwarz (1931, p. 56) synonymized *nyasae* with *moholi*, extending the range of the latter as far north as Tabora District, Tanganyika Territory. The specimen at hand differs markedly from our series of *moholi*. Compared with three individuals from Tete, *nyasae* is larger both externally and cranially, very much browner dorsally and on the tail, and "cinnamon-buff" rather than "ivory" ventrally. Cranially, the proportionally longer rostrum, more projecting premaxillaries, and larger teeth all distinguish *nyasae* from *moholi*. The distinctness of these two races is further confirmed by Loveridge's re-examination of the types and other material in the British Museum. Actually *nyasae* resembles *zanzibaricus* (a form that is intermediate towards *demidovii*) more closely than it does *moholi*. There is no size difference between the two, either externally or cranially; the slightly projecting premaxillaries found in *nyasae* are also characteristic of *zanzibaricus* (cf. Lawrence & Washburn, 1936, p. 256), while in relative size of M^3/ and incipient development of a cingulum on this tooth *nyasae* approaches the *demidovii* group even more closely than does typical *zanzibaricus*. In color, *nyasae* differs in being slightly more pinkish brown dorsally and pinkish buff ventrally, while specimens of *zanzibaricus* from Tanga and the Uluguru Mountains are more yellowish.

Size. ♂. 170. 215. 60. 38 mm.

Galago senegalensis moholi Smith

Galago moholi A. Smith, 1836, Report Exped. for Exploring Central Africa, app., p. 42: Banks of Marikwa and Limpopo, Bechuanaland.

O(tolicnus) mossambicus Peters, 1876, Monatsb. K. Preuss. Akad. Wiss. Berlin, p. 473, footnote: Tete, Mozambique.

1 ♂, 2 ♀ ♀ (M.C.Z. 44131–3) near Tete, M. 15–17.i.49.

Native name. *Kamundi* (Nyungwe).

Discussion. These specimens are topotypes of *O. mossambicus*, a form which Schwarz (1931, p. 56) and subsequent authors have considered synonymous with *moholi*. All three agree in being grayer with less ochraceous on the hind legs than in two specimens of *moholi* from Bechuanaland and Vaalwater, Transvaal, while a comparison of skulls of the same age shows the Tete animals to be slightly smaller than the more southern individuals. The differences are slight, and in a variable species, insufficient to warrant subspecific distinction and the consequent reviving of Peters' name.

Size. ♂. 145. 240. 53. 40 mm.; ♀. 145. 220. 57. 39 mm.

Breeding. Two embryos were present in the ♀ shot on January 15 when she peered from a hole in a baobab tree which she shared with the ♂.

CERCOPITHECIDAE

Cercopithecus mitis moloneyi Sclater

Cercopithecus moloneyi P. L. Sclater, 1893, Proc. Zool. Soc. London, p. 252: near Karonga, Lake Nyasa, Nyasaland (Moreau et al, 1946, p. 403).

1 ♂, 4 ♀ ♀, 1 yng., ♂ fetus (M.C.Z. 44264–70) Misuku Mtns. 23.ix–4.x.48.

Also heard on slopes of Nyika at 5000 ft. (13.xi.48).

Native names. *Lichilu* or *lichiru* (Yao); *mbisa* (Misuku).

Discussion. The Matipa Forest, where this series was obtained, is not far from the type locality, and specimens from there resemble closely our series of *moloneyi* taken previously in the mountains north of Lake Nyasa. Compared with the southern race, *nyasae*, *moloneyi* is a far more strikingly colored animal. The back behind the shoulders is "orange rufous" to "Sanfords brown" with the black rings on the hairs often inconspicuous. The fore limbs are entirely black, the long black hairs forming a handsome mantle on the shoulders. The head, instead of being evenly speckled, has the grayer cheeks marked off from the yellower top of the head by conspicuous black patches formed by the longer dark tips of the hairs in this region.

Size. ♂. 600. 700. 155. 39 mm.; ♀. 555. 690. 135. 35 mm.

Breeding. On October 4 a fetal ♂ measured 190. 265. 66. 25 mm. One infant, being carried by its mother in customary fashion, had its tail entwined around hers, something I (A.L.) do not recall having

seen before. Also at this season a considerable company of young monkeys, in charge of a few older animals (? subadult females), were much in evidence.

Cercopithecus mitis nyasae Schwarz

Cercopithecus leucampyx nyasae Schwarz, 1928, Ann. Mag. Nat. Hist. (10), **1**, p. 656, footnote: Fort Lister, Mlanje Mtn., southern Nyasaland.

♀ (M.C.Z. 44275) Lichenya Plateau. 14.viii.48.
1 ♂, 3 ♀ ♀ (M.C.Z. 44271–4) Cholo Mtn. 14–19.iii.49.

Seen also on the southern spur of Chiradzulu Mtn.

Native names. *Nchima* (Chewa); *Mchima* or *ncima* (Nyanja).

Discussion. The specimen from Lichenya Plateau is practically topotypic of *nyasae* and matches closely the four from Cholo Mountain. The markings in this race are not nearly as bright or as contrasting as in *moloneyi*. The yellowish rings on the hairs of the back are near "yellow ocher", this suffusion being most intense on the lower back. The top of the head and cheeks are rather evenly speckled, the pale rings being about "cream buff" on the top of the head and fading gradually into the grayer cheeks. The insides of the forelimbs are speckled with grayish as are the shoulders and hindlimbs while the hands, feet and outsides of the forelimbs are black. In all of the specimens, contrasting with the yellowish back, there is a trace of "orange rufous" on the tips of a very few of the hairs around the ischial callosities. A similar but more conspicuous patch is found in specimens of *nyasae* from Chirinda Mountain, Southern Rhodesia.

Size. ♂. 720. 915. 165. 43 mm.; ♀ (M.C.Z. 44274), 540. 740. 147. 45 mm.

Breeding. None held a fetus.

Diet. Stomachs were distended with finely masticated green leaves.

Enemies. Within a few days of our arrival at Likabula River, two of these monkeys were brought me by a native hunter. I did not acquire them as the man was asking ten shillings each for them, being valued for their meat. All the animals I shot were eaten.

Habits. As these handsome monkeys are much harassed by the natives they usually keep to the closed forests where they are more often heard than seen. When anyone approaches they promptly conceal themselves in the dense mass of epiphytic growth that smothers so many of the trees. An exception was provided by the old male shot below my Cholo camp in an isolated tree that it must have reached by coming through a hundred yards of standing maize corn. Almost

the entire body of this monkey was covered with a thick layer of yellow fat. In its tail were two long gashes, presumably made by the canines of another male; the cuts held minute maggots.

Cercopithecus aethiops rufoviridis Geoffroy

Cercopithecus rufo-viridis I. Geoffroy, 1842, Comptes Rend. Acad. Sci. Paris, **15**, p. 1038: Africa.

♂, ♀, yng. ♂ (M.C.Z. 44261–3) Mtimbuka. 23–28.ii.49.

Native name. *Kitumbili* (Yao).

Discussion. We have followed Schwarz (1926, p. 38) in calling the Nyasaland form *rufoviridis*.

Size. ♂. 540. 690. 150. 42 mm.; ♀. 440. 565. 118. 40 mm.; juv. ♂. 240. 330. 77. 33 mm.

Papio cynocephalus strepitus Elliot

Papio strepitus Elliot, 1907, Ann. Mag. Nat. Hist. (7), **20**, p. 194: Fort Johnston, south end of Lake Nyasa, Nyasaland.

yng. ♂ (M.C.Z. 44278) Mwaulambo, Misuku Mtns. 29.ix.48.
2 ♂♂ (M.C.Z. 44276–7) Mtimbuka. 8–22.ii.49.

Seen also at Likabula River (5.viii); Dedza (14.viii); Nchisi Mtn. (26.xi); and Blantyre-Tete road near Zambezi (3.i.49).

Native names. *Kolwe* (Misuku); *lijani* (Yao); *mkwere* (Chewa).

Discussion. The two from Mtimbuka are near topotypes of *strepitus* and differ very little from a specimen of *cynocephalus* from Kilosa, Tanganyika Territory. In the former, the outside of the limbs and top of the head are slightly more reddish, while the inside of the limbs and the hairs at the bases of the toes are silvery instead of reddish buffy. The tip of the tail in both Mtimbuka animals is pale, whereas in *cynocephalus* it is dark. The chief cranial difference lies in the proportion of rostrum to brain case. In our *strepitus*, the rostrum is relatively longer and the brain case shorter and narrower than in *cynocephalus*. In addition, in *strepitus*, the tooth rows, particularly the lower, converge posteriorly somewhat more while the cheek teeth tend to be shorter and broader and the canines and incisors more massive than in *cynocephalus*. The young one is not old enough for positive identification.

Size. Largest ♂. 900. 670. 240. 62 mm.; juv. 330. 285. 105. 45 mm.

Enemies. The largest was taken in a wire-noose snare set in a corn

plantation by Timbuka natives, who apparently do not eat baboons. In the more thickly settled south, each baboon has a regular meat value equivalent to about 50 cents (U.S.); they are probably purchased by Nguru.

SCIURIDAE

Aethosciurus lucifer (Thomas)

Xerus (*Paraxerus*) *lucifer* Thomas, 1897, Proc. Zool. Soc. London, p. 430: Kombe Forest, Masuku Range [i.e. Matipa Forest, Misuku Mtns.], Nyasaland.

5 ♂♂, 5 ♀♀ (M.C.Z. 44143–52) Misuku Mtns. 23.ix–5.x.48.

Native name. *Kasira* (Misuku).

Discussion. This series of topotypes from Matipa Forest matches closely Thomas' description. The black dorsal patch is more or less sprinkled with orange-ringed hairs and less well defined than in a series of *lucifer* from Rungwe Mountain further north, probably because most of them are changing pelage. Otherwise the two series are indistinguishable.

Size. ♂. 245. 210. 52. 22 mm.; ♀. 235. 220. 51. 20 mm.

Breeding. On September 23 one ♀ held three ovules (preserved).

Parasites. I removed many mites from the ears of one old ♂, ticks (*Ixodes rasus*) from its head, and seven big fleas from the anal region. A bare patch on the small of the back of this animal indicated where it had been scratching.

Habits. Most of the females were shot shortly after dawn while calling "ku-whek, ku-whek." These squirrels are widely distributed throughout Matipa Forest and active at all hours of the day except in the vicinity of the main path where they are so alert and secretive as to be rarely seen.

Paraxerus palliatus palliatus (Peters)

Sciurus palliatus Peters, 1852, Bericht über Verhandl. K. Preuss. Akad. Wiss. Berlin, p. 273: mainland near Mozambique Island, Mozambique (restricted by Moreau et al, 1946, p. 416).

♂ (M.C.Z. 44140) Nchisi Mtn. 1.xii.48.

Native name. *Gorogoro* (Chewa).

Discussion. This individual probably belongs to Peters' race although it is markedly more ochraceous, less reddish than his figure (1852, p. 134, pl. xxxi, fig. 1).

Size. ♂. 200. 170. 48. 18 mm.

Remarks. This squirrel was noisily denouncing a lion that sought refuge in its thicket in Nchisi Forest; the following day it was again calling at 8:00 A.M. when shot. Another red squirrel was seen in Cholo Mountain forest.

Paraxerus cepapi sindi Thomas & Wroughton

Paraxerus cepapi sindi Thomas & Wroughton, 1908, Proc. Zool. Soc. London, p. 543: Tete, Mozambique.

4 ♂♂, 3 ♀♀ (M.C.Z. 44116–22) near Tete, M. 14–27.i.49.

Native name. Sindi (Nyungwe).

Discussion. This little series of topotypes is fairly uniform in color and matches well Thomas and Wroughton's description, except that the shoulders as well as the back of the thighs are bright ochraceous. Young individuals tend to be slightly less ochraceous than old ones. In all of them, the contrast between the bright shoulder patches and the rest of the back is very conspicuous.

Size. ♂. 190. 150. 38. 19 mm.; ♀. 175. 180. 38. 20 mm.; the youngest, a ♂, only 115. 120. 56. 16 mm.

Breeding. On January 14, a ♀ held two embryos measuring 65. 42. 14. ? 3 mm., the ears being folded and tiny. Still smaller embryos were present in another ♀ shot on the 18th.

Habitat. These squirrels live in the hollow baobabs on whose great limbs they like to bask in the early morning and late afternoon. It would seem as if they did not venture out at all on days when the temperature was 100° or over.

Paraxerus cepapi soccatus Wroughton

Paraxerus cepapi soccatus Wroughton, 1909, Ann. Mag. Nat. Hist. (8), **3**, p. 515: Vwaza, Hewe River, northern Angoniland, Nyasaland (Moreau et al, 1946, p. 416).

♂ ♀ (M.C.Z. 44141–2) near Vwaza Marsh. 21.ix.48.

Native name. Palimenti (Misuku).

Discussion. The topotypes of this race, when compared with a specimen of typical *cepapi* from the Transvaal, have the feet yellower and the back more rusty than described. The two forms are obviously different, however. While the browner *soccatus* lacks contrasting patches on shoulders and hindlegs, the grayer *cepapi* has the shoulders

faintly, and the hindlegs strongly, washed with ochraceous. Further, in *cepapi* there are typically three black rings on the hairs of the tail, while in *soccatus* there are two.

Size. ♂. 185. 150. 40. 20 mm.; ♀. 145. 155. 40. 19 mm.

Habitat. As we were driving through woodland eleven miles north of Katumbi, just before the turn-off to Vwaza (or Vwasa on some maps), one of these squirrels, hotly pursued by the other, rushed across the road with two more not far behind.

Paraxerus cepapi cepapoides Roberts

Paraxerus cepapi cepapoides Roberts, 1946, Ann. Transvaal Mus., **20**, p. 316: Zimbiti, near Beira, Mozambique.

9 ♂♂, 4 ♀♀ (M.C.Z. 44103–15) Mtimbuka. 11–21.ii.49.

Native names. Denga (Manganja); *gologolo* (Yao).

Discussion. Miss St. Leger (1932a, p. 960) has identified specimens from southern Nyasaland as *cepapi sindi*. Our rather large series from Mtimbuka differs from our topotypes of *sindi* in being larger (h.f. (s.u.) 42–46, av. 44.3 mm. in the former; 36–42, av. 38.8 mm. in *sindi*). The lower belly, and sometimes the chest and throat also, are washed with buffy instead of being clear white as in *sindi* and the rusty patches on rump and shoulder are less extensive and in less sharp contrast to the back. Compared with *soccatus*, the Mtimbuka animals are larger and darker, with the flanks, thighs and shoulders more reddish and three instead of two black rings on the hairs of the tail. No topotypes of *cepapoides* are available for comparison and Roberts does not compare this form with *sindi*. However, as nearly as can be told from his description, the Mtimbuka specimens are more closely related to this Beira form than to either *sindi* or *soccatus*. A complete understanding of the relationships of these three supposed forms must await further collecting.

Measurements. ♂. 205. 190. 45. 20 mm.; ♀. 200. 150+. 46. 21 mm.

Habitat. The entire series were shot right in Nkungumbi Village where they were chasing each other over thatches, granary bins, and the branches of trees. The first seven proved to be males, most of whom were suffering from a disfiguring skin disease that left large areas covered with black scabs; the hind limbs appeared particularly affected.

MUSCARDINIDAE

Claviglis nanus (de Winton)

Myoxus (*Eliomys*) *nanus* de Winton, 1897, Proc. Zool. Soc. London, for 1896, p. 799: Mazoe, Mashonaland, Southern Rhodesia.

♀ (M.C.Z. 44165) Misuku Mtns. 13.x.48.
2 yng. ♀ ♀ (M.C.Z. 44162–3) Nchisi Mtn. 27.xi–3.xii.48.

Native name. *Kadiamkwikwi* (Chewa).

Discussion. Except for its slightly larger size, the adult from the Misukus resembles closely the original description of *nanus*. Compared with *angolensis*, which is apparently a closely related form (not a *Gliriscus*), the bases of the hairs on cheeks and throat are gray, not white. Otherwise it resembles typical *angolensis* from Angola more than it does *a. jordani* from Northern Rhodesia. This latter is described as a larger animal with more white on the tail than the Misuku specimen. The specimens from Nchisi Mtn. probably belong to this form although they are too young for positive identification.

Size. ♀ ad. 97. 70. 17. 16 mm.; ♀ juv. 60. 42. 15. 10 mm.

Habitat. The two juveniles almost certainly lived in the thatched roof of Nchisi Boma; the youngest was found in a tin in the pantry and the slightly larger one was trapped in the pantry safe a week later, bananas being used as bait.

Claviglis johnstoni (Thomas)

Graphiurus johnstoni Thomas, 1897, Proc. Zool. Soc. London for 1896, p. 934: Zomba, Nyasaland.

♀ (M.C.Z. 44164) Misuku Mtns. 27.ix.48.
♂ (M.C.Z. 44161) Zomba Plateau. 7.ix.48.

Native name. *Kawundi* (Misuku).

Discussion. The topotype is a young animal that has not shed its milk premolars. The older animal from the Misukus, although differing in its slightly larger size and narrower tail from Thomas' description of *johnstoni* (not *johnstoni* Heller, which is a synonym of *griseus*), is best attributed to this form until the dormice are revised. Compared with a specimen of *murinus isolatus* from the Uzungwe Mtns., it differs in its larger size, bigger feet and ears, relatively shorter tail, and conspicuously larger skull with bigger teeth.

Whatever the names finally agreed upon for the African dormice, the two species found in the Misukus may easily be distinguished by

the browner, darker color of the form here called *johnstoni*. The brown tail is only faintly frosted with white laterally and lacks a white tip, the belly is gray, only faintly washed with buffy, and the larger, broader feet have a touch of brown on both metatarsals and metacarpals. Cranially the narrower skull, larger teeth and conspicuously smaller bullae, are the most distinctive characters.

Size. ♂. 65. 60. 15. 10 mm.; ♀. 97. 80. 17. 15 mm.

Parasites. Six larval ticks were removed from between the whiskers on muzzle of ♀, also a flea.

Habitat. In a termite-riddled pole, standing ten feet high, in forest clearing.

CRICETIDAE

Tatera lobengulae panja Wroughton

Meriones tenuis Peters (not A. Smith), 1852, Reise nach Mossambique, Säugeth., p. 149: Tete, Mozambique.

Tatera panja Wroughton, 1906, Ann. Mag. Nat. Hist. (7), **17**, p. 486: Chicosta, 60 miles above Tete, Zambezi River, Mozambique.

4 ♂♂, 3 ♀♀ (M.C.Z. 43907–12, –14) near Tete, M. 17–27.i.49.

Native name. *Panya* (Nyungwe; definitely specific).

Discussion. This series of near topotypes is distinguished by its pale color with the dorsal area, even in young animals, only slightly suffused with blackish. The black eye ring is reduced to a small spot at the anterior corner of the eye and the dark streak on the dorsal surface of the tail is not sharply defined. Cranially *panja* differs from its near neighbor *shirensis* in having a somewhat smaller skull with flatter braincase and more slender rostrum. These characters are slight but readily apparent when series are examined. The genus *Tatera* is so much in need of a complete revision that no attempt has been made to examine the specific status of *panja* and *shirensis*, although the series at hand suggests very strongly that the two forms are not more than subspecifically distinct.

Size. ♂. 140. 160. 30. 21 mm.; ♀ .130. 170. 31. 19 mm.

Tatera nyasae shirensis Wroughton

Tatera nyasae shirensis Wroughton, 1906, Ann. Mag. Nat. Hist. (7), **17**, p. 490: Malosa Mtn., Upper Shiré, Nyasaland.

1 ♂, 3 ♀♀ (M.C.Z. 43863, 43897–8, 43900) Nchisi Mtn. 27.xi–11.xii.48. 7 ♂♂, 4 ♀♀, 1 yng. (M.C.Z. 43875–84, –91, 44336) Chitala River. 16.xii.48;

2 ♂♂, 2 ♀♀ (M.C.Z. 43902–5) Mtimbuka. 7–21.ii.49.
2 ♂♂, 1 ♀ (M.C.Z. 43892, –95, 45139) Zomba Plateau. 6–9.ix.48.
4 yng. (M.C.Z. 44081–3, 44246) Chiradzulu Mtn. 27.viii.48.

Native names. *Kaloto* (Misuku); *tonondo* (Chewa and Ngoni).

Discussion. Wroughton (*loc. cit. supra*) says that Nyasaland *Tatera* divide into two well-marked color forms which are constant geographically, the southern one, *shirensis*, being more heavily suffused with blackish. He lists specimens from Fort Johnston as typical, so it is interesting to note that of the series at hand those from Mtimbuka, which is fourteen miles from Fort Johnston, are the palest with the dark markings around the eye and on the tail almost as reduced as in our series of *panja*. The series from Nchisi Mountain are the darkest, their blackish eye rings sometimes extending as an ill-defined line to the base of the ears. Specimens from Chitala are intermediate between these two. Individuals from a single locality resemble each other rather strongly and there seems to be a tendency for populations to develop slight, but well-marked, color differences. This may in part account for the rather large number of forms of *Tatera* currently recognized.

Size. ♂ (M.C.Z. 43904), 155. 165. 31. 20 mm.; ♀ (M.C.Z. 43880), 140. 165. 31. 22 mm.

Breeding. On August 27, a ♀ juv. was only 80. 59. 23. 13 mm., and on September 6, a ♂ juv. 78. 54. 23. 12 mm.

MURIDAE

Dendromus whytei whytei Wroughton

Dendromus whytei Wroughton, 1909, Ann. Mag. Nat. Hist. (8), **3**, p. 247: Fort Hill, Nyasaland.

♂ (M.C.Z. 44172) Nchenachena. 20.xi.48.
2 ♀♀ (M.C.Z. 44173–4) Nchisi Mtn. 1–3.xii.48.
♀ (M.C.Z. 44175) Cholo Mtn. 14.iii.49.
♀ (M.C.Z. 44171) Likabula River. 6.viii.48.

Native names. *Kamkoko* (Chewa); *kapamzimbi* (Manganja); *sonto* (Ngoni).

Discussion. No topotypes of this form were secured, but the obsolescent dorsal stripe, ochraceous suffusion of the undersurface, and the short, nail-like character of the fifth toe clearly distinguish this little series from Wroughton's *nyikae*. Wroughton lists both forms, from the Nyika Plateau which is also the type locality for *nyasae*, a situation resembling that found on Mt. Elgon. There four forms occur together, *Dendromus insignis*, which is closely related to

nyasae (Allen & Loveridge, 1933, p. 101), *whytei pallescens, ruddi* and *acraeus*, the last of which may be related to *nyikae*. Cranially, *whytei* is conspicuous for its small size and relatively broad flat palate with no well marked transverse ridge posteriorly.

Size. ♂. 66. 76. 16. 11 mm.; ♀ (M.C.Z. 44175), 75. 80. 16. 10 mm.

Dendromus mesomelas nyasae Thomas

Dendromus nyasae Thomas, 1916, Ann. Mag. Nat. Hist. (8), **18**, p. 241: Nyika Plateau, Nyasaland.

1 ♂, 2 ♀ ♀, 1 yng. (M.C.Z. 44167–70) Misuku Mtns. 14–15.x.48.
♂ (M.C.Z. 44166) Nyika Plateau. 13.xi.48.

Native name. Kanampwero (Misuku).

Discussion. The Nyika specimen is topotypical. The series from the Misuku Mountains match it closely.

Size. ♂ (M.C.Z. 44166), 83. 86. 18. 14 mm.; ♀ (M.C.Z. 44167), 78. 91. 20. 13 mm.

Diet. The Nyika ♂ was trapped in woodland forest with meat bait; a second specimen taken the same night was apparently eaten by some other rodent, as suggested by the characteristic way in which the back of the skull was gnawed.

Steatomys pratensis pratensis Peters

Steatomys pratensis Peters, 1846, Ber. über Verhandl. K. Preuss. Akad. Wiss. Berlin, p. 258: Tete, Mozambique.

♂ (M.C.Z. 43930) near Tete, M. 24.i.49.

Native name. Nsana (Nyungwe).

Discussion. The Tete *Steatomys* is a "cinnamon-brown" mouse, paler on the flanks, cheeks and around the eyes, and darker medially from the tip of the nose to the base of the tail. There is a very small white patch below the ear, and, as described, the hairs of the belly are white all the way to the base.

Size. ♂. 101. 52. 17. 15 mm.

Habitat. Taken from a shallow burrow in damp sand beneath debris left by the Zambezi on a sandbar. As it was surrounded by water the mouse may have reached the sandbar on a tree that had been swept from the river bank and cast up nearby.

Steatomys pratensis nyasae subsp. nov.

Type. M.C.Z., No. 44213, an adult male skin and skull from

Likabula River, Mlanje Mountain, Nyasaland. Collected by Arthur Loveridge, July 29, 1948.

Paratypes. M.C.Z., Nos. 44214–6 & 44218–27, being 8 ♂♂ and 5 ♀♀ with same data as type but collected between July 27 and August 1, 1948. Also a ♂ (M.C.Z. 44228) from Chitala River, Nyasaland, taken December 16, 1948.

Description. Stratomys pratensis nyasae is most easily told by its dark color, rather short tail, and the great reduction of the white patch below the ear.

In general color, the type is "sayal brown," heavily and finely speckled with blackish particularly in the mid-dorsal region. The flanks are brighter with fewer of the long, black-tipped guard hairs. The hands, feet and belly are white to the bases of the hairs and contrast sharply with the back. The cheeks are rather brighter than the flanks and there is a minute tuft of grayish hairs at the base of the ear, which is itself dark with a patch of blackish brown hair on the antero-external margin. The type series is fairly uniform in color. Occasional individuals sometimes have the flanks grayer than in the type, while the tuft of hairs at the base of the ears is sometimes white, always minute, and occasionally lacking. Compared with typical *pratensis*, *nyasae* is less reddish and much more heavily suffused dorsally with blackish. A topotype of *muanzae* from Tanganyika Territory is paler and grayer with conspicuous white patches below the ears. Topotypes of *pratensis kasaicus* from the Congo are larger and redder with a longer tail. Topotypes of *loveridgei* have not been seen, but two examples from Singida are much smaller and paler, especially on the face, with much more conspicuous white patches behind and below the ears.

Cranially, *nyasae* may be told by its lightly built but rather broad skull. As seen from above the wider braincase and zygomatic arches, and relatively narrower interorbital region, distinguish it from *p. pratensis*. *S. p. kasaicus* is a conspicuously larger form with relatively longer rostrum and slightly smaller bullae, while skulls of *loveridgei* are markedly smaller. Skulls of *muanzae* are not available for comparison.

Measurements. The seven fully adult individuals from Likabula are fairly uniform in size. Following are the measurements, in millimeters, of the type, and the largest (♀ M.C.Z. 44216) and smallest (♂ M.C.Z. 44222) of the series.

Field measurements: Head and body 95, 101, 86; tail 43, 41, 41; hind foot (*s.u.*) 15, 19, 17, on the dried skins the type and the other

male measure (*c.u.*) 17.8 and 17.5 respectively; ear 16, 15, 14.

Skull measurements: Greatest length 25.0, 25.8, br.; condylobasilar length 21.1, 22.9, 20.5; palatal length 13.2, 13.8, 12.6; zygomatic width 13.3, br., br.; width across bullae 12.2, 12.0, 12.0; maximum width of brain case taken above meatus 11.0, 11.3, 11.3; interorbital width 4.0, 4.2, 4.2; width outside molars 6.2, 6.3, 5.8; nasals 10.9, 10.7, br.; length of upper cheek teeth 4.2, 4.3, 4.2; length of lower cheek teeth 4.0, 4.0, 3.8 mm.

Discussion. Previous authors have considered the Nyasaland *Steatomys* to be the same as that from Tete, so these fourteen specimens from Likabula and the single individual from Chitala River are particularly valuable in establishing the distinctness of this new form. The museum also has a small series of skins and skulls from Chikore and Mt. Selinda forest in southeastern Southern Rhodesia, as well as a skin from Luiswishi River, Northern Rhodesia; none of these differs significantly from the type series. Apparently *nyasae* occurs in damp or forested country while the very distinct *pratensis* is a dry country form.

Native name. Mbewa (Nyanja).

Thamnomys (Grammomys) surdaster surdaster
Thomas & Wroughton

Thamnomys surdaster Thomas & Wroughton, 1908, Proc. Zool. Soc. London, p. 550: Zomba, Nyasaland.

2 ♂♂, 3 ♀♀ (M.C.Z. 43867–70, 43916) Misuku Mtns. 8–14.x.48.
♀ (M.C.Z. 43901) Nchisi Mtn. 27.xii.48.
yng. ♀ (M.C.Z. 44241) Mwera Hill. 13.xii.48.
3 ♂♂ (M.C.Z. 43864–5, 44242) Zomba Plateau. 7–9.ix.48.
2 ♂♂, 2 ♀♀, 3 yng. (M.C.Z. 43871–4, 44078–80) Cholo Mtn. 11–23.iii.49.

Native names. Kaliwambani (Ngoni); *nampwera* (Misuku); *sonto* (Chewa; Manganja).

Discussion. This whole series is fairly uniform in color and size, the older specimens tending to be more ochraceous on the back and flanks. In none of them is the buffy lateral line sharply defined and in the older of the two topotypes, as well as in one of the specimens from Cholo, it is entirely absent. Likewise the amount of buffy on the metatarsals varies. In some, including one topotype, the color is restricted to a median streak; in others it spreads across the whole foot. All of the specimens have white toes.

The skulls of the Zomba and Cholo series, including one with well worn teeth, are very uniform in size and slightly smaller than the two old individuals from the Misuku Mountains. An average slightly larger size for northern animals is also shown in our series from Tanganyika Territory.

Size. ♂ (M.C.Z. 43869), 122. 182. 24. 17 mm.; ♀ (M.C.Z. 43872), 115. 180. 22. 16 mm.

Breeding. On March 23, at Cholo, the largest ♀ was found with three nestlings whose eyes were still unopened; one of the three, a ♀, measured 60. 62. 14. 7 mm.

On December 13, at Mwera Hill, another nest was found in a lion's skin left in an open shed. One adult thicket-rat escaped, leaving a ♀ juv. 90. 125. 20. 16 mm.

While externally the Mwera nest is composed of rather coarse, though soft, grasses, the entire central portion consists of exceedingly fine soft fibres — possibly taken from sisal or similar substance used in the construction of the thatched grass hut. On the other hand, no grass appears to have been utilized in the construction of the Cholo nest whose exterior is formed of the stripped midribs of plants, possibly ferns, lined with other fine fibrous vegetable matter.

Thallomys ruddi (Thomas & Wroughton)

Thamnomys ruddi Thomas & Wroughton, 1908, Proc. Zool. Soc. London, p. 549: Tete, Mozambique.

♀ (M.C.Z. 43866) Mtimbuka. 26.ii.49.
♀ (M.C.Z. 43906) near Tete, M. 19.i.49.

Native name. *Mbewa* (Nyungwe).

Discussion. The specimen from Tete is slightly larger than the measurements given for the type and has a faint dusky streak down the center of the metatarsals; otherwise it agrees closely with the original description and undoubtedly represents this form characterized by its big bullae and small teeth. The species *ruddi* was described as a *Thamnomys* some years before Thomas erected the genus *Thallomys* for the bushy tailed South African tree rats with large bullae and later authors have included *ruddi* in the *Grammomys* section of the former genus. Even Ellerman leaves it there although he notes certain resemblances to *Thallomys*. Actually *ruddi* resembles *Thallomys damarensis* and *moggi* far more closely than it does *Grammomys*. The greatly enlarged bullae, particularly the posterior section behind

the meatus, the less divergent supraorbital ledges with a more pronounced tendency towards the formation of a postorbital process, and the deeper pterygoid fossae, are all characteristic of *Thallomys*. In reduction of the cusps of $M^1/_1$ and $M^2/_2$ *ruddi* also agrees with *Thallomys*. Both genera show a reduction in the posterointernal and posteroexternal cusps of $M^1/$ and in the posterointernal, posteroexternal and anteroexternal cusps of $M^2/$ but this is carried farther in *Thallomys*. Similarly in the lower jaw there is a greater reduction of the median and external supplementary cusps in *Thallomys* than in *Thamnomys*. Externally, the traces of gray markings around the eyes and extending in an ill-defined line towards the nose, the absence of an ochraceous lateral line, shorter tail, and broad, heavy feet, are all characters which readily distinguish *ruddi* from *Thamnomys*. In view of Ellerman's inclusion in *Thallomys* of the *namaquensis* group of *Aethomys*, it is interesting to note that in cranial characters, particularly in the reduction of cusps and in the more acute angle of those of the lower jaw, *ruddi* resembles *Thallomys* more closely than do the races of *namaquensis*.

The specimen from Mtimbuka is a smaller, younger animal, somewhat darker than the topotype with similar markings on the hind and fore feet. Length of tooth row is the same in both, although the teeth are unworn in the Mtimbuka specimen and the skull is smaller.

Size. Topotype ♀. 130. 180. 25. 22 mm.; Mtimbuka ♀. 125. 146. 23. 16 mm.

Rattus rattus kijabius (Allen)

Mus kijabius J. A. Allen, 1909, Bull. Am. Mus. Nat. Hist., **26**, p. 169: Kijabe, Kenya Colony.

♂ ♀ (M.C.Z. 43926–7) Misuku Mtns. 23.ix.48.
♀ (M.C.Z. 43925) Nchisi Mtn. 27.xi.48.
♂ (M.C.Z. 43928) Zomba Plateau. 8.ix.48.
yng. ♀ (M.C.Z. 43924) Chiradzulu Mtn. 27.viii.48.
♀ (M.C.Z. 43923) Cholo Mtn. 21.iii.49.
♀ (M.C.Z. 43929) Likabula R. 1.viii.48.
1 ♂, 2 ♀♀ (M.C.Z. 43920–2) near Tete, M. 10–14.i.49.

Native names. *Koswe* (Chewa; Ngoni); *makwisi* (Nyungwe); *ukusa* (Misuku).

Discussion. Although the Tete animals come from the type locality of Peters' *Mus tettensis* which has been considered synonymous with

R. r. alexandrinus, the series at hand are clearly referable to the East African form, *kijabius*.

Size. ♂ (M.C.Z. 43922), 150. 195. 33. 21 mm.; ♀ (M.C.Z. 43920), 170. 185. 31. 23 mm.

Enemies. A halfgrown roof rat was recovered from the stomach of a sand-snake (*Psammophis s. sibilans*) at Tete.

Aethomys chrysophilus ineptus (Thomas & Wroughton)

Mus chrysophilus ineptus Thomas & Wroughton, 1908, Proc. Zool. Soc. London, p. 546: Tete, Mozambique.

2 ♂♂ (M.C.Z. 43896, 43899) Nchisi Mtn. 8–9.xii.48.
3 ♂♂, 1 ♀ (M.C.Z. 43893–4, 43915, 44240) Zomba Plateau. 7–8.ix.48.

Native name. Tonondo (Chewa & Ngoni, who do not distinguish it from *Tatera n. shirensis*).

Discussion. These specimens belong to the *chrysophilus* section of *Aethomys*. They have the rather narrow, flat skulls described for *ineptus*, and have been referred to this race although they differ from Thomas and Wroughton's description in certain details, notably their shorter tails and rostra.

Dr. T. S. C. Morrison-Scott has kindly re-examined Whyte's series from the Nyika Plateau and confirms Thomas' account (1897a, p. 430) of two separate species there. The one described by Thomas as *nyikae* and later called *chrysophilus nyikae* by Ellerman, is not a race of *chrysophilus*. The other called *chrysophilus* by Thomas clearly belongs to this species but probably is subspecifically distinct.

Before the discovery of *c. ineptus* at Tete, the range of *c. chrysophilus* was supposed to extend from Mashonaland at least as far as the Nyika Plateau. With the description of a distinct race from within this range the status of the northern animal needs to be re-examined.

Size. ♂ (M.C.Z. 43896), 145. 170. 30. 21 mm.; ♀ (M.C.Z. 43894), 145. 160. 27. 19 mm.

Parasites. A ♂ killed in the pantry of Nchisi Boma, had a large tick (*Ixodes* sp.) among his whiskers, a smaller one on the throat. Both preserved.

Praomys jacksoni delectorum (Thomas)

Epimys delectorum Thomas, 1910, Ann. Mag. Nat. Hist. (8), **6**, p. 430: Mlanji [i.e. Mlanje] Plateau, 5500 ft., Nyasaland.

6 ♂♂, 4 ♀ ♀, 1 yng. (M.C.Z. 44012–3, –15–20, 44244, –50, –53) Misuku Mtns. 1–14.x.48.

5 ♂♂, 5 ♀ ♀ (M.C.Z. 44021–30) Lichenya Plateau, Mlanje Mtn. 12–21.viii.48.

Native names. *Jikagada* (Nguru); *ngusuka* (Misuku, also for *Lophuromys*).

Discussion. I have followed G. M. Allen in considering *jacksoni* distinct from the West African species *tullbergi*. The topotypical series from Mlanje varies little in age and is fairly uniform in pattern, all have the lower back suffused with blackish and the flanks, cheeks and nape more brightly colored. These areas may be either reddish or ochraceous, and the belly in all specimens is washed, more or less heavily, with pinkish buff. In the oldest of the series the long black tips of the rump hairs have turned dark reddish brown and the narrow subterminal bands are very inconspicuous. In one such specimen, which is molting, the new hair is much more brightly colored, with the pale subterminal rings in sharp contrast to the black tips. Evidently fading as well as age is responsible for the reddish rump so often found in this genus.

The Misuku series varies more both in age and in color than the topotypes. Those that are comparable in age with the Lichenya series resemble them rather closely in dorsal color except for one which is in the bright, rusty-reddish phase so often found in related subspecies. Four considerably older animals have a more extensive reddish-brown rump patch than any of the topotypes. A slight, but I think taxonomically unrecognizable, distinction may be made between the northern and southern series on the basis of the grayish white rather than pinkish buff tips on the belly hairs in the former, and the slightly greater average size of the hind feet and ears. Compared with *P. j. melanotus* from the nearby mountains to the north of Lake Nyasa, all of the Nyasaland specimens differ in their much brighter, less blackish, coloring.

Cranially our topotypes show that *delectorum* may be distinguished from *melanotus* by having the width across the tooth rows less in proportion to the length of the tooth row, the individual teeth somewhat smaller, and the zygomatic plate narrower. The differences are average rather than absolute and the Misuku series is intermediate towards *melanotus*.

Size. ♂ (M.C.Z. 44244), 115. 137. 24. 19 mm.; ♀ (M.C.Z. 44020), 105. 135. 24. 21 mm.

Diet. All taken in mousetraps baited with bread, cheese or raisins.

Parasites. A flea from a Mlanje mouse, and mites from a Misuku specimen were preserved.

Habitat. On Mlanje most of the mice were trapped in the copse behind "Araloon Cottage," but several were taken in the house itself. The Misuku material was obtained from traps set beside the stream flowing through Matipa Forest, and none was taken outside the forest.

Mastomys coucha microdon (Peters)

Mus microdon Peters, 1852, Reise nach Mossambique, Säugeth., p. 149: Tete and Boror, Mozambique.

♂ ♀ (M.C.Z. 44013, 44032) Misuku Mtns. 28.ix–9.x.48.
♂ (M.C.Z. 44031) Nchenachena. 19.xi.48.
5 ♂♂, 6 ♀♀, 1 ? (M.C.Z. 44055–66) Nchisi Mtn. 26.xi–7.xii.48.
2 ♂♂, 4 ♀♀ (M.C.Z. 44045–50) Chitala River. 16.xii.48.
4 ♂♂ (M.C.Z. 44051–4) Zomba Plateau. 7–8.ix.48.
10 ♂♂, 1 ♀, 3 yng. (M.C.Z. 44067–77, 44247–9) Chiradzulu Mtn. 28–30.viii.48.
♀ (M.C.Z. 44183) Cholo Mtn. 11.iii.49.
10 ♂♂, 2 ♀♀ (M.C.Z. 44033–44) Likabula River. 29.vii–2.viii.48.

Native names. Mpuku (Chewa; Manganja); *ngwede* (Nyanja); *ukusa* (Misuku).

Discussion. No topotypes of this form were collected, and the series from Likabula River, Chiradzulu Mountain and Zomba Plateau are mostly youngish, characteristically dark animals. From farther north, the series of well grown adults taken at Chitala and Nchisi vary in color from reddish brown, particularly on the rump and flanks, to grayer brown entirely lacking any such tinge. Specimens previously identified as *victoriae*, from Ukerewe Island and the mountains to the north of Lake Nyasa are almost equally variable and the total average differences between the two series are but slight. These may be summarized as follows: adults of *microdon* tend to have the flanks brighter and the dorsal surface more yellowish gray than in our *victoriae*, while such individuals as are reddish have a greater concentration of this color on the rump and lower back; young *microdon* average somewhat less dark than comparable individuals of the northern race. These characters are not good enough to positively identify isolated specimens, so the identification of the Nchenachena and Misuku animals is subject to revision if longer series from the same place do not confirm their apparent closest resemblance to

microdon. Cranially, specimens of *microdon* of comparable age vary less than externally. A slight flattening of the braincase, common to old individuals, is not entirely an age character, and there is considerable variation in the anterointernal cusp of $M^1/$. In a very few individuals this cusp is definitely bilobed; most have a trace of an enamel reentrant while in some it is entirely single. Further, in some skulls the pattern differs on each side.

Size. ♂ (M.C.Z. 44057), 133. 111. 24. 19 mm.; ♀ (M.C.Z. 44075), 120. 117. 22. 17 mm.

Breeding. On August 28, three nestlings were brought in, of which the largest measured 79. 67. 19. 16 mm.

Diet. Cheese bait served to trap one beneath my bed at Likabula camp where it had disturbed me twice the previous night.

Enemies. Apparently it was one of these multimammate mice that I recovered from the stomach of a striped sand-snake (*Psammophis s. sudanensis*).

Leggada musculoides marica Thomas

Leggada bella marica Thomas, 1910, Ann. Mag. Nat. Hist. (8), **5**, p. 88: Beira, Mozambique.

♀ (M.C.Z. 44230) Nchisi Mtn. 11.xii.48.
♀ (M.C.Z. 44229) Likabula River. 31.vii.48.
♂ (M.C.Z. 44231) Cholo Mtn. 21.iii.49.

Discussion. Our three specimens are from the northern end of the rather extensive range assigned this race by Thomas. It and related forms were previously regarded as subspecies of *bella*. Actually they are all closely related to *musculoides* of West Africa (cf. Lawrence, 1945, pp. 91–92) which has priority.

Size. ♂. 57. 40. 12. 8 mm.; ♀ (M.C.Z. 44230), 56. 45. 11. 8 mm.

Leggada triton murilla Thomas

Leggada triton murilla Thomas, 1910, Ann. Mag. Nat. Hist. (8), **5**, p. 91: Machakos, 5400 ft., Kenya Colony.

5 ♂♂, 2 ♀♀ (M.C.Z. 44085, 44234–7, 45137–8) Misuku Mtns. 24.ix–15.x.48.
♂ (M.C.Z. 44239) Nyika Plateau. 12.ix.48.
♀ (M.C.Z. 44252) Vipya Plateau. 18.ix.48.
2 ♂♂, 1 ♀ (M.C.Z. 44084, 44232–3) Nchisi Mtn. 27.xi–9.xii.48.
2 ♀♀ (M.C.Z. 44238, 44251) Zomba Plateau. 2–4.ix.48.
2 ♂♂ (M.C.Z. 43749, 43752) Cholo Mtn. 17.iii.49.
♂ (M.C.Z. 45136) Lichenya Plateau. 16.viii.48.

Native names. *Kalota* (Misuku); *mende* (Ngoni); *tsibwi* (Chewa).

Discussion. Both externally and cranially these mice are indistinguishable from our rather variable series of *murilla* from the mountains to the north of Lake Nyasa. In individuals from both areas the "pinkish buff" lateral line varies markedly in width though a trace of it is always present, while occasionally the belly hairs are tipped with "pinkish buff" rather than "ivory white." This is apparently a rather widespread form in Nyasaland though not reported from there before.

Size. ♂ (M.C.Z. 43749), 85. 62. 15. 13 mm.; ♀ (M.C.Z. 44236), 75. 55. 15. 12 mm.

Breeding. On September 24 a crude nest composed of rootlets and grass, both coarse and fine, was found beneath vegetable debris on the Matipa Ridge. The nest measured 90 x 70 x 70 mm. over all and held the ♀ whose measurements are given above and two young measuring 64–65. 46. 15. 10 mm. A still smaller ♂ (57. 40. 12. 8 mm.) was found on March 21 beneath a pile of sodden and rotting grass on Cholo.

Parasites. A flea was preserved from a young mouse caught in Matipa Forest on 15.x.48.

Enemies. One pigmy mouse was recovered from the stomach of a house-snake (*Boaedon l. lineatus*) on Nchisi Mtn.

Cricetomys gambianus viator Thomas

Cricetomys gambianus viator Thomas, 1904, Ann. Mag. Nat. Hist. (7), **13**, p. 413: Likangala [Likangala River rises in the central part of Zomba District and flows eastward to empty into Lake Chilwa], Nyasaland.

♂ (M.C.Z. 44137) Cholo Mtn. 22.iii.49.

Native name. *Bwampini* (Manganja).

Discussion. This young adult ♂ resembles closely Thomas' original description, although the type is obviously an older animal. Compared with our series of *viator* from Rungwe Mountain at the northern end of Lake Nyasa, it differs in having a whiter and somewhat more thinly haired belly. Otherwise the animals from the northern and southern ends of the lake are indistinguishable.

Size. ♂. 320. 322. 72. 40 mm.

Parasites. Ticks (*Ixodes ampullaceus*) and a hemimerid (*Hemimerus deceptus*) were present in the fur of this giant rat which was snared deep in the forest.

Lophuromys aquilus aquilus (True)

Mus aquilus True, 1892, Proc. U. S. Nat. Mus., **15**, p. 460, text fig. 1: Kilimanjaro Mtn. 8,000 ft., Tanganyika Territory.

4 ♂♂, 1 ♀, 2 ? (M.C.Z. 44005–11) Misuku Mtns. 1–15.x.48.
4 ♂♂, 3 ♀♀, 3 ? (M.C.Z. 43984–93) Nyika Plateau. 30.x.–15.xi.48.
2 ♂♂ (M.C.Z. 43994–5) Vipya Plateau. 18.ix.48.
7 ♂♂, 2 ♀♀ (M.C.Z. 43996–44004) Zomba Plateau. 2–10.ix.48.
6 ♂♂, 3 ♀♀, 1 ? (M.C.Z. 43974–83) Lichenya Plateau. 10–13.viii.48.

Native names. Etwa (Nguru); *ngusuka* (Misuku, as also for *Praomys*); *tobora* (Ngoni).

Discussion. This is another exceedingly variable species in both color and dentition. Recent workers with long series available for study agree as to the difficulty of dividing it subspecifically. As a whole, the series from different localities in Nyasaland matches very closely the series from the mountains of southwest Tanganyika discussed by Allen and Loveridge (1933, p. 114). There is, however, a very interesting difference in the homogeneity of local populations, with the northern ones tending to vary more than the southern. Thus ten specimens from Kigogo in the Uzungwe Mountains, Tanganyika Territory, all taken in January, vary tremendously. The back is either dark and finely speckled or paler and more coarsely speckled; the belly hairs vary from those which lack dark bases and are entirely pinkish to those which are grayish at the base and have the tips more ochraceous; the hind feet in some have the dark metatarsal mark spread over most of the foot, including the toes; in others the toes are pale and the metatarsal mark is almost absent. To the south some of these same characters have become definitely established in certain of the populations. The series from Zomba and Lichenya lack pale coarsely speckled individuals, and the bellies are more uniformly pinkish. The Zomba series all have dark toes with the metatarsals almost entirely dark. In the Lichenya series the feet vary more. Back and belly vary more in the Nyika series but the color of the feet is rather constant. Here the toes are pale and the metatarsals ochraceous buff with a more or less reduced dusky mark externally. Finally, in rats from the Misukus the total variation is almost as great as in the Kigogo series.

Examination of the skulls shows that the Nyika series, collected in November, contains a higher proportion of larger, older individuals than the Lichenya and Zomba series collected in August and September respectively. In addition, there is a tendency for individuals at the

same stage of development to be very slightly larger in northern Nyasaland than in the south.

This species was reported from the Nyika Plateau by Thomas (1897b, p. 936) although Whyte and Johnston apparently did not collect it in southern Nyasaland. The specimens collected by Loveridge were all hardened in formalin overnight and then thoroughly washed before skinning. This is a method which he has used in the past with *aquilus* to keep their delicate skins from tearing.

Size. ♂ (M.C.Z. 43984), 145. 83. 21. 18 mm.; ♀ (M.C.Z. 44003), 135. 67. 19. 17 mm.

Diet. Omnivorous; stomach contents of Mlanje mice included earthworms and grubs. On the Nyika, one held the belly skin and hind foot of an adult *Bufo taitanus* subsp. nov.

Parasites. A small tick (*Ixodes* sp.) was crawling over a harsh-furred mouse trapped in the Matipa Forest. A large tick, a flea and mites were present on a Nyika specimen's fur that was alive with lice whose eggs were attached to the bases of adjacent hairs. The left ear of this mouse was ragged and bleeding as if it had been scratching frantically.

Habits. Obviously diurnal, as revealed by trapping. At 8 A.M. a harsh-furred mouse was killed with a stick by my gunbearer as it was feeding beside the path in open, secondary forest on Zomba Plateau.

Habitat. On the Nyika this mouse was as much at home in open, marshy vleis as in woodland.

Beamys major Dollman

Beamys major Dollman, 1914, Ann. Mag. Nat. Hist. (8), **14**, p. 428: Mlanje Nyasaland.

♀ & 4 yng. (M.C.Z. 44206–10) Nchisi Mtn. 1.xii.48.

Native name. Chidiubaya (Nchesi: "because it carries things off to its burrow.")

Discussion. The Nyasaland form of this rare genus differs from the type species in its larger size. Cranially the Nchisi adult is even larger than the type of *major* and differs further in having the tail mottled throughout its entire length instead of being merely white tipped. Of interest also is the minute, anterointernal cusp on M^1, conspicuously present in the newly erupted, unworn teeth of all four of the young, and not entirely obliterated in the well-worn teeth of the adult ♀. Typically this cusp is supposed to be entirely lacking, indeed

the cusp formula of 2, 3, 3 for $M^1/$ is one of the principal generic characters of *Beamys*. The genus, however, is known from very few specimens. *B. major* was apparently described from a single individual, and so until better series can be obtained it seems best to assume that the occasional presence of a very small anterointernal cusp on $M^1/$, as well as the mottling of the entire tail, are part of the normal variation of this large southern form.

Size. ♀. 160. 140. 22. 23 mm. ♂ juv. 111. 55. 20. 13 mm.; ♀ juv. 102. 52. 20. 13 mm.

Breeding. On December 1 this mother and her four, well-grown young were brought in by a Chewa native.

Saccostomus campestris campestris Peters

Saccostomus campestris Peters, 1846, Ber. über Verhandl. K. Preuss. Akad. Wiss. Berlin, p. 258: Tete, Mozambique.

♂ (M.C.Z. 44212) near Tete, M. 17.i.49.

Native name. Suku (Nyungwe).

Discussion. This topotype is a rather pale, brownish gray animal, slightly darker on the nape and back than on the flanks. Following Ridgway, it is about "light drab" washed with "avellaneous." The line of demarcation between the pure white undersurface and the dark back is high up on the sides of the face and the flanks, leaving the fore legs entirely white. On the hind legs the dark dorsal color extends in a narrow strip as far as the ankles.

Size. ♂ yng. 115. 41. 17. 15 mm.

Saccostomus campestris elegans Thomas

Saccostomus elegans Thomas, 1897, Proc. Zool. Soc. London, p. 431: Karonga, Lake Nyasa, northern Nyasaland.

♀ (M.C.Z. 44201) Nchisi Mtn. 6.xii.48.
♂, 1 yng. (M.C.Z. 44211, 44243) Mtimbuka. 18–22.ii.49.
♀ (M.C.Z. 44217) Likabula River. 1.viii.48.
1 ♀, 3 yng. (M.C.Z. 44202–5) Ruo River. 1.iv.49.

Native names. Chatute (Chewa; Ngoni; Nyanja); *dugu* (Nyanja).

Discussion. The four adults of varying ages agree in differing from *campestris* in the darker, more slatey, color of the back as well as in the relation of dark and pure white areas. In all four the line of demarcation is lower on the flanks than in *campestris*, the thighs are

more extensively dark and there is an unbroken dark strip from the shoulders down onto the forelegs.

Probably this whole series is *elegans* although only some of Thomas' cranial characters are apparent and none of these is as well developed as he found it to be. *S. elegans* is described as having a much longer and narrower skull than *campestris* with less widely open antorbital foramina, narrower interorbital region, differently shaped interparietal and smaller palatal foramina. Comparison of the series at hand with a topotype of *campestris*, shows no significant differences in shape of interparietal and size of palatal foramina. The Nchisi, Mtimbuka and Likabula specimens, which are similar in size as well as in skull length to this topotype, do differ from it, as described by Thomas, in having the antorbital foramen slightly less widely open and the skull slightly narrower and flatter. Further all four *elegans* have a median spine on the posterior margin of the palate. Altogether, cranial differences between the two forms are but slight and Ellerman (1941, vol. 2, p. 285) is undoubtedly correct in saying that the two forms are only subspecifically distinct.

Size. ♂ (M.C.Z. 44211), 122. 35. 16. 16 mm.; ♀ (M.C.Z. 44202), 121. 39. 18. 17 mm.

Breeding. On February 18 a nestling ♂, measuring only 51. 18. 10. ? 4 mm., was picked up on the path.

Acomys selousi de Winton

Acomys selousi de Winton, 1897, Proc. Zool. Soc. London, for 1896, p. 807, pl. xl, fig. 2: Essex Farm, near Bulawayo, Matabeleland, Southern Rhodesia.

4 unsexed (M.C.Z. 44186–9) Nchenachena. 22.xi.48.
♂ (M.C.Z. 44200) Chiradzulu Mtn. 27.viii.48.

Native names. Kachenzi (Chewa; Nyanja); *sakachenzi* (Ngoni).

Discussion. These medium sized, rather brightly colored, spiny mice agree closely with de Winton's original description, one of the young adult skulls being almost identical in measurements with those of the type of *selousi*. Further, a topotype of *Acomys ignitus* differs from our Nyasaland series exactly as Dollman (1910, p. 230) says *ignitus* and *selousi* differ. In the latter, the smaller size, duller color, more finely haired, less coarsely scaled tail, and palatal foramina not reaching beyond the level of the first lamina of M^1 are all conspicuous features. Not mentioned by Dollman, but equally conspicuous in *selousi*, are the

smaller bullae and absence of a latero-ventral ridge on the zygomatic arch.

Size. ♂. 93. 60. 17. 13 mm.

Diet. Trapped with cheese bait.

Habitat. Nchenachena is the only place where I have found spiny mice common in East Africa. On November 21 five mice were taken in six traps set, but all their ears were eaten off in addition to several snouts and other parts. The following day four were taken in the six traps, and though in much the same condition as those taken the day before, it seemed advisable to save them though unsexed and without measurements.

Dasymys incomtus alleni subsp. nov.

Dasymys ? helukus Allen & Loveridge (not of Heller), 1933, Bull. Mus. Comp. Zool., **75**, p. 115: from Uzungwe, Ukinga, Rungwe and Poroto Mountains.

Type. M.C.Z. No. 26322, an adult male skin and skull from Ilolo, Rungwe Mountain, Tanganyika Territory. Collected by Arthur Loveridge, March 31, 1930.

Paratypes. The half-dozen specimens from five localities listed in the above citation; also

2 ♂♂, 1 ♀ (M.C.Z. 44177–9) Misuku Mtns. 24.ix–4.x.48.
2 ♂♂ (M.C.Z. 44180–1) Lichenya Plateau. 10–12.viii.48.

Description. Dasymys incomtus alleni is most easily distinguished by its heavy rostrum and broad nasals, depressed at the tip.

This is a rather uniformly colored race with no dark suffusion in the center of the back. In fresh adult pelage, the pale "ochraceous tawny" subterminal rings contrast sharply with the black tips of the hairs and give the animal a rather dark yellowish brown appearance above. The sides, lacking the dark tips, are brighter and merge gradually with the "pale olive-buff" of the undersurface. Compared with a series of *helukus* from Kaimosi, Kenya Colony, the type of *alleni* is noticeably more yellowish on the belly and flanks; additional specimens from the region to the north of Lake Nyasa also average brighter in this respect. These differences are slight, and on the basis of external characters alone it is not always possible to distinguish the two races. Compared with a topotype of *medius, alleni* is noticeably brighter, particularly on the head, while specimens of *fuscus* from Mt. Selinda, Southern

Rhodesia, are less conspicuously speckled, have a concentration of dark down the middle of the back, and grayer flanks.

Cranially, *alleni* is quite distinct and fully grown adults can readily be identified by the heavy rostrum with broad nasals bent down at the tip and sometimes inflated on each side of the midline. This, combined with the abruptly expanded, rather heavy, supraorbital ridges, gives the skulls a somewhat massive appearance, particularly as compared with *nigridius* and *savannus*, and, to a certain extent, with *helukus*. Further, *alleni* has the width across the roots of the incisors somewhat greater in proportion to the length of the diastema than comparable animals of the other three races (width across roots of incisors more than 50 per cent of distance from front of molars to alveolar point in *alleni*, less than 50 per cent in *nigridius*, *savannus* and *helukus*).

Certain other less obvious characters help to distinguish *alleni*. As compared with *helukus* the teeth average larger and the palate narrower. The interparietal suture is shorter than, or as long as, the frontoparietal suture from the midline to the supraorbital ridge, whereas in *helukus* the interparietal suture is longer. The zygomatic arch in *alleni* tapers rather evenly, whereas in *helukus* it is broadly expanded in the maxillojugal region and then narrows abruptly posterior to the ventral end of the maxillojugal suture. The antorbital foramen as seen from above is shallower in *alleni* with a less well-marked pocket anteriorly by the root of the incisor. A topotype of *medius* is intermediate between *helukus* and *alleni* in a number of ways. In general shape and proportions, as well as in its heavy rostrum, it resembles *alleni*. The nasals, however, are less bent down at the tip and narrower. The interparietal suture is long and the antorbital foramen rather deep as in *helukus*. Typical *medius* comes from the Ruwenzori Mountains; from farther south, on Idjwi Island in Lake Kivu, we have a specimen which resembles *alleni* even more closely in structure of the rostrum.

A specimen of *fuscus* from Mt. Selinda has a less angular skull with the interorbital region less sharply constricted, the supraorbital ridges more evenly diverging, the rostrum rather massive but with slender nasals bent down at the tip, and relatively large teeth.

Measurements. Measurements in millimetres are given of the type.

Field measurements: head and body 172; tail 151; hind foot 31; ear 19 mm.

Skull measurements: greatest length 36.3; condylo-basal length 36.2; palatal length 21.2; zygomatic width 19.1; mastoid width 14.4;

interorbital width 4.6; width outside molars 7.7; nasals 5.8 x 4.7; alveolar length of upper cheek teeth 7.5 mm.

Discussion. In the absence of sufficient comparative material, the type and other specimens from the mountains north of Lake Nyasa were tentatively referred to *helukus* by Allen & Loveridge (*loc. cit. supra*). The fact that races of *helukus* were not reported from the Lake region on the edge of the Congo basin, implied that *helukus* had spread in its typical form easterly and southerly to reach this area. The distribution problem was further complicated by the description of two distinct races, *saramnus* and *nigridius* from south central Kenya. To the west, *medius* was supposed to be a race of *bentleyae*. Actually the evidence at hand shows that Ellerman (1941, p. 121) is probably correct in considering the East African and Lake region forms as all belonging to the same species. Cranially, *saramnus*, *nigridius* and *helukus* resemble each other closely. Of the three, the westerly form *helukus* approaches *medius* in certain traits; *medius* in turn is closer to *alleni* than any of the three northern and eastern forms, while the above-mentioned specimen from Idjwi Island is clearly intermediate between *medius* and *alleni*. Apparently then, one type of animal evolved moving east into the Kenya forests, and another moving south through the lake region to reach its extreme development in the mountains north of Lake Nyasa. Animals from the Matipa-Wilindi Ridge in the Misuku Mountains of Nyasaland are less extreme than the type and associated series. Specimens from southern Nyasaland are intermediate between the Misuku series and *fuscus* from Mt. Selinda with the somewhat darker color and less expanded nasals of the latter.

It gives me great pleasure to name this form after the late G. M. Allen, whose careful work has contributed so much to our knowledge of African mammals.

Native names. *Kiraswa* (Nguru); *mbewa* (Misuku, but not specific).

Pelomys fallax insignatus Osgood

Pelomys fallax insignatus Osgood, 1910, Ann. Mag. Nat. Hist. (8), **5**, p. 276: Fort Hill, northern Nyasaland.

4 ♀♀, 1 ? (M.C.Z. 43931–5) Misuku Mtns. 23.ix–15.x.52.
♀ (M.C.Z. 43945) Nchenachena. 20.xi.48.
2 ♂♂, 2 ♀♀ (M.C.Z. 43937–40) Nchisi Mtn. 27.xi–2.xii.48.
2 ♂♂, 2 ♀♀ (M.C.Z. 43941–4) Zomba Plateau. 2.ix.48.
♀ (M.C.Z. 43936) Cholo Mtn. 10.iii.49.

Native names. Bvumbi (Manganja); *mbewa* (Misuku); *mende* (Chewa and Ngoni).

Discussion. The specimens from Matipa-Wilindi Ridge in the Misukus are near topotypes of this form and agree with Osgood's description in lacking a medial dorsal stripe. Ventrally the hairs are uniformly tipped with "ochraceous buff" or else, in the inguinal and throat region, are slightly whiter. Series from Nchisi Mountain and Zomba Plateau average somewhat less buffy ventrally and three of the Zomba specimens have an ill-defined dorsal streak. Kershaw (1922, p. 191) identifies his series from Cholo and Chiromo as *fallax*, which is typically striped, although only three of his ten specimens show any trace of a dorsal stripe. While agreeing with him that this character is not constant, it is also apparent that, as stated by Osgood (*loc. cit. supra* p. 277), "in specimens from more northerly localities it is increasingly indistinct and becomes entirely absent in those from Northern Nyasa." Another striped race, *iridescens*, has been described from the Taita Hills. Comparison of a young topotype of this form with a Misuku rat of similar age shows that, in addition to possessing a well marked dorsal stripe, the former has the sides from chin to thighs darker owing to the shorter subterminal pale rings, and the ventral surface is grayer. A specimen from the Usambaras and the Uluguru series, previously identified as *fallax* (Allen & Loveridge, 1927, p. 437), differs in the same way from Nyasaland animals and should be referred to *iridescens*. A young adult specimen from Magrotto lacks the dorsal stripe and may be intermediate towards *insignatus*.

Cranial differences between *insignatus* and the Uluguru-Usambara *iridescens* are slight, and average rather than absolute. In general, in the latter, the rostrum is larger and heavier in proportion to the size of the braincase, the nasals project farther in front of the incisors and the latter are more recurved. Skulls of *insignatus* tend to have the parietal ridges more broadly spreading and the parietals more domed, which gives the braincase a deceptively broader appearance.

Size. ♂ (M.C.Z. 43942), 156. 127. 26. 18 mm.; ♀ (M.C.Z. 43936), 165. 155. 30. 18 mm.

Lemniscomys griselda calidior (Thomas & Wroughton)

Arvicanthis dorsalis calidior Thomas & Wroughton, 1908, Proc. Zool. Soc. London, p. 545: Tambarara, Gorongoza Mtns., Zambezia, Mozambique.

♂ (M.C.Z. 44127) Likabula River. 31.vii.48.

1 ♂, 3 ♀ ♀ (M.C.Z. 44128–30, 44182) near Tete, M. 8–27.i.49.

Native names. *Mpera* (Nyanja); *mponi* (Nyungwe); *nangwavi* (Yao).

Discussion. The original description includes both Beira and Tete in the range of this subspecies, and it is interesting to find that the Likabula specimen does not differ significantly from our Tete series.

Parasites. Many mites were preserved from the fur of the Likabula rat.

Enemies. What appeared to be the rump and tail of one of these striped grass-rats was recovered from the stomach of a house-snake (*Boaedon l. lineatus*) at Likabula.

Habitat. As we were driving towards Tete, one of these semi-diurnal rodents raced across the road and sought refuge among the sparse dry grass that had grown up through a pile of brambles. As we approached its refuge the rat dashed out and went down a shallow burrow where we found it six inches beneath the surface.

Lemniscomys striatus massaicus (Pagenstecher)

Mus (*Lemniscomys*) *barbarus* L. var. *massaicus* Pagenstecher, 1885, Jahrb. Hamburg. Wiss. Anstalt, **2**, p. 45: Lake Naivasha, Kenya Colony (restricted by Hollister, 1919).

2 ♂♂ (M.C.Z. 44184–5) Misuku Mtns. 23.ix–6.x.48.

Native name. *Usalamsanya* (Misuku).

Discussion. Externally these two specimens are indistinguishable from our long series of *massaicus* from various parts of Kenya and Uganda. The skulls also resemble closely in size and general proportions those of *massaicus*. Such cranial differences as do exist, as in the shape of the zygomatic plate and antorbital foramen, are too slight for taxonomic recognition.

Size. ♂. 120. 138. 24. 16 mm.

Diet. In the Misukus these zebra-rats eat bananas, cassava and potatoes.

Rhabdomys pumilio diminutus (Thomas)

Isomys pumilio diminutus Thomas, 1893, Proc. Zool. Soc. London for 1892, p. 551: Mianzini, east of Lake Naivasha, Kenya Colony.

Arvicanthis pumilio nyasae Wroughton, 1905, Ann. Mag. Nat. Hist. (7), **16**, p. 639: Mlanje Plateau, 6000 feet, Nyasaland.

4 ♂♂, 3 ♀♀, 2 yng. (M.C.Z. 43824–32) Nyika Plateau. 30.x–17.xi.48*
2 ♂♂ (M.C.Z. 43822–3) Lichenya Plateau. 13–16.viii.48.

Discussion. I can find no good characters separating the Lichenya (= Mlanje) Plateau topotype of *nyasae* from Kenya specimens of *diminutus*. Supposedly the former have shorter bullae than the latter; in the specimens at hand the reverse is actually true, although the difference is very slight. The original description of *nyasae* also implies that it is less fulvous than *diminutus*, a distinction that does not obtain in the Lichenya and Kenya specimens. The rather long series from the Nyika Plateau shows considerable variation in the amount of fulvous wash on the sides and shoulders, agreeing in this with the series from north of Lake Nyasa described by Allen & Loveridge (1933, p. 118). It is interesting to note that it is the more fulvous individuals from both of these places which match most closely the topotypes of the allegedly paler southern race.

Size. ♂ (M.C.Z. 43831), 122. 85. 20. 14 mm.; ♀ (M.C.Z. 43828), 155. 88. 21. 12 mm.

Breeding. On November 13 a nestling ♂, measured 75. 63. 17. 11 mm.; on the 17th a slightly larger ♀, 90. 76. 17. 12 mm.

Diet. One Lichenya four-striped grass-rat was trapped between 9.45 A.M. and 2.30 P.M. in a cupboard in the house with cheese bait. The animal's stomach held green and white mealy matter interspersed with vegetable fibres. Another, trapped in a copse close behind the house, was eaten except for its rump and tail probably by some other rodent. Many more were similarly lost in this way.

Habitat. As we overturned a charred log on the recently burnt-over Nyika Plateau, a rat ran from beneath and down its nearby burrow. The burrow extended in an almost straight line for a distance of about six feet from the entrance to the exit, and was at no point more than six inches below the surface, generally only from three to four inches.

OTOMYS

Northern Nyasaland is the meeting place for three very distinct species of *Otomys*. An attempt to trace their relationships has led to a rather detailed study of some of the other members of the genus. Certain early identifications have been revised in the light of additional material and two new species are herewith described. The high degree of variability in features that are usually good key characters in the Muridae has led to considerable diversity in the grouping of species of the Otomyinae. Early classifications of Wroughton (1906) and Dollman (1915a) placed considerable emphasis on the number of

laminae in the molars and the grooving of the incisors. In 1918 when Thomas subdivided the genus *Otomys*, he made it clear that, on a generic level, the shape of the skull was a better indicator of relationships than either of these characters. On a subgeneric level, he considered extra lamination of $M/_1$ as a good diagnostic character. A new subgenus, *Anchotomys* is then described for *Otomys anchietae*, a form with five laminae on $M/_1$. Subsequent studies by Allen & Loveridge (1933, p. 121) have shown that the four-laminated species *denti* and *kempi* belong in the same species group as *anchietae*, and the present work has brought to light a five-laminated form, externally very different from *Anchotomys*, which is probably intermediate towards the *tropicalis* group.

In addition to confirming Thomas' (1918, p. 204) opinion that general shape and proportions of the skull are the most reliable characters for grouping the species of this genus, the usefulness of certain other characters has been considered in detail. Of these, shape of the nasals, and of the rostrum in proportion to the cranium, in fully adult individuals has been found to be important. The appearance of this part of the skull changes considerably with age; further when different forms are compared it is found that young adult individuals differ far less than the old. In some cases the proportions of the zygomatic plate and arch are also useful characters. Size of the bullae and of the teeth varies within a species, while wear considerably changes the outline of the molars, particularly $M^3/$.

Externally, slight but consistent differences were found between the species in tail, feet and in general color pattern. Variation within a species was found in size of the ears and amount and color of the hairs lining them. This latter is to a certain extent an age variation also. In addition the feet usually become more grizzled with age, and in some forms the contrast between the dark-footed young adults and the gray-footed old individuals is very striking.

Otomys jacksoni Thomas

Otomys Jacksoni Thomas, 1891, Ann. Mag. Nat. Hist. (6), **7**, p. 304: [Crater of] Mt. Elgon, 13,000 feet.

Otomys angoniensis elassodon Allen & Lawrence (part), 1936, Bull. Mus. Comp. Zool., **79**, p. 106.

Discussion. Two specimens (M.C.Z. 31368 and 31370) from Kaburomi, Mt. Elgon, previously reported as *O. angoniensis classodon*

(*loc. cit. supra*), are apparently rather pale representatives of *jacksoni*. The humped skull and double grooving of the lower incisors are characteristic, and cranial measurements are close to those given for the type. Externally these two individuals resemble closely topotypical specimens of *thomasi*, *t. squalus* and *orestes*, all of which have but a single groove on the lower incisors. As a group, which may be called the *jacksoni* group, all of these four forms have certain characters which easily distinguish them from the *tropicalis* group, a more widespread species occurring over at least part of the same general area. The former are softer furred with the general dorsal color a yellowish, rather than a reddish, brown. The undersurface is more evenly washed with buffy without well differentiated gray areas on the throat and inguinal region, pale post-auricular patches are present, and the feet are conspicuously buffy even in young individuals. Cranially, they may be distinguished chiefly by their strongly arched skull with the depth of the rostrum immediately behind the incisors less in proportion to the depth from the highest part of the orbit to the alveolar margin in front of $M^3/$. In addition, the auditory bullae are slightly larger and the zygomatic arch is more massive in proportion to the rest of the skull.

Descriptions of the double grooved forms, *Otomys percivali* and *O. dartmouthi*, indicate that these also belong to this same species group. *O. typus* from Abyssinia, although closely related to the *jacksoni* group, and very similar externally, differs cranially in its less arched skull, pale outer portion of the upper incisors and the anteroposterior compression of the last laminae of $M^3/$. As Thomas (1918, p. 204) has pointed out, the grooving of the lower incisors and the lamina formula of $M^3/$ in *Otomys* are highly plastic. In the widespread *tropicalis* group these vary among specimens collected at the same time in the same place, as for instance in our series of *O. tropicalis elgonis* from Sipi. Here there is considerable variation in the depth of the second groove on the lower incisor and three individuals have six instead of seven laminae on $M^3/$. In forms of the *jacksoni* group which has a discontinuous distribution, these characters have become more fixed. Thus, isolated colonies, while resembling each other closely in general cranial and external features, vary considerably in their dental pattern.

A series from the Uzungwe Mountains, previously identified as *percivali*, is apparently quite distinct and may be known as:

Otomys uzungwensis sp. nov.

Otomys percivali Allen & Loveridge (not of Dollman), 1933, Bull. Mus. Comp. Zool., **75**, p. 119.

Type. M.C.Z., No. 26645, an adult female skin and skull from Dabaga, Uzungwe Mountains, Iringa District, Tanganyika Territory. Collected by Arthur Loveridge, December 31, 1929.

Paratypes. M.C.Z. material examined, viz. skins and skulls of 4 ♂♂, 5 ♀♀, and skin only of 1 ♀ from Dabaga; skins and skulls of 2 ♂♂, 5 ♀♀ from Iringa in the Uzungwe Mtns.; also 2 ♀♀ (M.C.Z. 43947, 43950) Nyika Plateau. 4 & 17.xi.48.

Description. A rather aberrant form with certain of the cranial features of the *jacksoni* group as defined above, and an external resemblance to *O. angoniensis.*

General color above buffy brown, coarsely and heavily streaked with black. The subterminal rings of the hairs near "cinnamon buff", rump somewhat redder, sides somewhat paler and grayer. Conspicuous, whitish post-auricular patches are absent although a very few specimens have a minute patch of slightly paler hairs behind the ears. Around the eyes, the hairs lack gray bases so that the ochraceous subterminal bands form a more or less well-defined orbital ring of this color. The pale tips on the hairs of the belly are close to "pinkish buff", somewhat grayer on the throat and inguinal region. The tail is bicolored, dark above, buffy below, and the feet are rather evenly peppered with buffy and dark brownish hairs. Adults in the type series are very uniform in general color and two specimens from the Nyika Plateau show no significant differences. Younger specimens tend to be darker with a less contrasting rump, and have the first metatarsal darker than the rest of the foot. Compared with *O. angoniensis,* which occurs in much the same area, *uzungwensis* may be distinguished externally by its better defined orbital ring, grayer color, and slightly more contrasting rump.

Cranially, the double grooving of the lower incisors and small thickset skull with rounded dorsal profile and relatively heavy rostrum, are characteristic of this form. It differs from members of the *jacksoni* group in the flatter skull, the greater dorso-ventral depth of the rostrum in relation to the distance from the top of the orbit to the front of M^3/, and the differently shaped nasals. These are short, rather broad, and flattened as far forward as the moderately well-defined angle which sets off the expanded, downward curving anterior

half. From *O. typus,* it may be distinguished by its relatively heavy rostrum, well pigmented incisors, and the presence of only seven laminae on $M^3/$. Compared with *O. angoniensis,* skulls of *uzungwensis* may be told by their somewhat more delicate appearance with narrower interorbital region and far more slender rostrum. The nasals, even in old individuals, are not inflated.

Measurements. Measurements in millimetres of four full grown adults are given, those of two ♀♀ (the type and M.C.Z. 26643) followed by those of two ♂♂ (M.C.Z. 26638 and 26646).

Field measurements: head and body 155, 160, 180, 195; tail 80, 80, 60 (apparently broken and healed), 90; hind foot 26, 25, 25, 25; ear 25, 25, 25, 20 mm.

Skull measurements: greatest length 38.8, 38.4, 38.9, 38.9; condylobasal length 36.7, 35.3, 36.6, br.; palatal length 20.6, 19.5, 20.0, 20.7; zygomatic width 19.1, br., 18.8, 18.8; mastoid width 12.9, 12.1, br., br.; interorbital width 4.0, 4.1, 4.1, 4.4; width outside molars 7.1, 7.2, 7.1, 7.4; nasals 18.5 x 7.3, 16.8 x 7.4, 17.6 x 7.5, 17.8 x 7.4; length of nasals is difficult to take accurately as the nasofrontal suture is often obliterated, particularly in old animals; for this reason length of rostrum was also measured on a line from the posterior margin of the antorbital foramen to the tip of the nasals; length of rostrum 13.8, 13.1, 13.9, 13.1; alveolar length of upper cheek teeth 9.2, 9.5, 9.4, 9.4; depth from highest point of orbit to front of $M^3/$ 13.0, 12.3, 12.7, 12.5 mm.

Discussion. The type series was originally identified as *percivali,* a species with two well-marked grooves on the lower incisors, similar, but brighter, coloring, and creamy white post-auricular patches. The study of additional material now shows that *uzungwensis* has a much flatter skull and is a smaller, less brightly colored animal lacking the pale post-auricular patches which are such a conspicuous feature of *percivali.*

While *uzungwensis* is apparently most closely related to the *jacksoni* group, it is interesting to note that the rather heavy rostrum and broad nasals of this southern species suggests *angoniensis,* while the slenderer rostrum and nasals of the northern forms of this group are reminiscent of the species *tropicalis,* itself a northern form. This may be evidence that two, widespread, rather plastic species, *angoniensis* and *tropicalis,* are gradually encroaching upon, and to a certain extent breeding with, the less plastic members of an older, *jacksoni,* group.

Parasites. A larval tick (*Ixodes* sp.) was preserved from one of the Nyika paratypes (M.C.Z. 43950).

Otomys barbouri sp. nov.

Otomys tropicalis elongis Allen & Lawrence (part, not of Wroughton), 1936, Bull. Mus. Comp. Zool., **79**, p. 106: Kaburomi and Madangi material only.

Otomys angoniensis elassodon Allen & Lawrence (part, not of Osgood), 1936, Bull. Mus. Comp. Zool., **79**, p. 106: most, but not all, of the Kaburomi series.

Type. M.C.Z., No. 31369, an adult male skin and skull from Kaburomi, 1°14′ N., 34°31′ E., 10,500 feet, Mount Elgon, Uganda. Collected by Arthur Loveridge, December 28, 1933.

Paratypes. M.C.Z. material examined, viz. Nos. 31371–2, 31421–5, 31438, being skins and skulls of 4 ♂♂, 3 ♀♀ and one unsexed specimen from Kaburomi (with same data as the type); also M.C.Z. No. 31376, a ♀ skin and skull from Madangi, Mount Elgon, Uganda. All collected by Arthur Loveridge.

Description. The pale belly, grizzled feet, and rather short bicolored tail, in combination with five laminae on $M/_1$, readily distinguish this species.

General color over the whole dorsal surface is dull reddish brown evenly and finely mixed with blackish; sides slightly paler, the stiffened hairs on cheeks and sides of the neck markedly so. The subterminal rings of the hairs are near "ochraceous buff". The ventral surface is conspicuously paler than the dorsal, the tips of the rather long hairs being near "light buff", the throat and inguinal region slightly grayer.

Compared with *tropicalis elgonis*, also found on Mt. Elgon, *barbouri* may be distinguished externally by its less reddish color, paler belly, longer, softer fur, evenly speckled feet, gray, rather than dark brown, wrists, and the suggestion of an ochraceous orbital ring. It differs from *jacksoni* chiefly in its larger size, longer, grizzled rather than ochraceous, hind feet, in the absence of a pale postauricular patch and in the grayish color of the inguinal and throat region.

Cranially, the presence of five lamina on $M/_1$ and seven on $M^3/$, and the absence of a second groove on the lower incisors readily distinguish this new form. The skull is long and flattened with the interorbital region strongly pinched in, particularly posteriorly, the anterior half of the nasals is scarcely bent down and moderately broad

with a distinct angle at the transition from broad to narrow parts. The sides of this broad portion are evenly curved downward so that, in dorsal view, the end of the rostrum looks parallel sided and almost tubular. The zygomatic arch is abruptly expanded, bending the antorbital plate sharply outward, and the greatest zygomatic width is often anterior.

Measurements. Measurements in millimetres of four full grown adults are given, those of two ♂♂ (the type and M.C.Z. 31422) followed by those of two ♀ ♀ (M.C.Z. 31421 and 31423).

Field measurements: head and body 185, 190, 160, 168; tail 89, 83, 60 (apparently broken and healed), 76; hind foot 26, 27, 21, 26; ear 19, 20, 21, 23 mm.

Skull measurements: greatest length 38.4, 37.8, 39.6, 37.6; condylobasal length 37.6, 36.4, 38.4, 35.9; palatal length 20.7, 20.2, 21.9, 20.3; zygomatic width 19.0, br., br., 17.9; mastoid width 13.6, 13.9, 13.4, 12.2; interorbital width 4.3, 4.2, 3.8, 4.1; width outside molars 7.2, 7.3, 7.2, 7.1; nasals 15.8 x 7.0, 16.4 x 6.9, 17.2 x br., 16.1 x 6.7; length of rostrum taken as in *uzungwensis* 12.7, 12.6, 13.8, 12.7; alveolar length of upper cheek teeth 9.2, 9.2, 9.6, 9.3; depth from highest point of orbit to front of M^3/ 12.7, 12.6, 13.8, 12.7 mm.

Discussion. This very peculiar species has been found only in the alpine meadow zone of Mt. Elgon where *O. jacksoni* also occurs. The two have a certain superficial resemblance in color and character of the fur, although cranially they are entirely distinct.

In outline and proportions of the skull as well as in lamina formula *O. barbouri* closely resembles *Anchotomys*. It differs chiefly in the shape of the nasals which, in the latter, are less abruptly expanded and flatter transversely. Externally *barbouri* differs more from *Anchotomys* than do some of the dark races of *tropicalis*. The occurrence of a species which is somewhat intermediate between *Anchotomys* and the *tropicalis* group is not surprising as the two resemble each other in many ways. Their chief cranial difference lies in the rather curved dorsal profile and smaller interparietal of the latter. Otherwise the skulls are very similar. Externally the difference is even less. Specimens of *tropicalis elgonis* are almost as dark as topotypes of *denti*, the feet are identical in color, the tail is only slightly shorter and indistinctly bicolor, and the belly paler than the back only in throat and inguinal region.

It is a pleasure to name this form for the late Thomas Barbour,

whose contagious enthusiasm for the world around him made the study of natural history an absorbing and fascinating task.

Otomys kempi Dollman

Otomys kempi Dollman, 1915, Ann. Mag. Nat. Hist. (8), **15**, p. 152: Burunga, 6000 feet, Mt. Mikeno, Belgian Congo.

1 ♂, 1 ♀, 1 yng. (M.C.Z. 43948–9, 43966) Nyika Plateau. 1–5.xi.48.

Discussion. These three specimens resemble very closely the series of *kempi* previously reported (Allen & Loveridge, 1927, p. 437) from the Uluguru Mountains, Tanganyika Territory. Externally the very dark color with scarcely contrasting belly, blackish undersurface of the tail, and scantily haired, dark feet readily distinguish this species from its neighbors. The skulls of both series are characterized by their flat dorsal profile, long, parallel-sided interorbital region, the lateral compression of the expanded portion of the nasals, and the rather slender zygomatic arch. There is a single groove on the lower incisors, four laminae on $M/_1$, and six laminae on $M^3/$. The bullae of the Uluguru series are small, those of the Nyika individuals are slightly more inflated. This southwesterly extension of the range of *kempi* is of great interest, indicating as it does that the species spread south from the Kivu region and then northeasterly as far as the Uluguru Mountains. It may even have reached the Usambara Mountains, if *Otomys denti sungae* actually is conspecific as the author supposes — in spite of its paler belly, bicolored tail, and the double grooves on the lower incisors.

The close relationship of *denti* and *kempi* with *anchietae* has been discussed by Allen & Loveridge (1933, p. 121) who supposed that the two former were northern representatives, and the latter a southern, of a dark Congo basin form. The Nyasaland records indicate that the eastward spread of the Angolan species, as shown by the distribution of *anchietae lacustris*, has cut across the southern extension of the northern form, apparently isolating the Uluguru colony. The extraordinary plasticity of the genus and the tendency of isolated colonies of other species to develop peculiar local characteristics, makes it all the more surprising to find no significant differences between these two widely separated populations of *kempi*.

Enemies. Remains of *Otomys*, either this species or *uzungwensis*, were present in the stomachs of a harrier (*Circus macrourus*) and grass owl (*Tyto c. capensis*), and formed the bulk of a leopard's feces.

Otomys angoniensis angoniensis Wroughton

Otomys irroratus angoniensis Wroughton, 1906, Ann. Mag. Nat. Hist. (7), **18**, p. 274: M'Kombhuie, Angoniland, Nyasaland.

Otomys irroratus nyikae, Wroughton, 1906, Ann. Mag. Nat. Hist., (7), **18**, p. 276: Nyika Plateau, Nyasaland.

2 ♂♂, 4 ♀♀, 4 yng. (M.C.Z. 43952–7, 43967–701) Misuku Mtns. 24.ix–15.x.48.
1 ♂, 1 yng. (M.C.Z. 43946, 43965) Nchenachena. 20.xi.48.
♂ (M.C.Z. 43951) Vipya Plateau. 18.ix.48.
2 ♂♂, 2 ♀♀, 3 yng. (M.C.Z. 43958–61, 43971–3) Zomba Plateau. 2–8.ix.48.
♂ yng. (M.C.Z. 44176) Cholo Mtn. 11.iii.49.
1 ♂, 1 ♀, 1 yng. (M.C.Z. 43962–4) Lichenya Plateau. 12–21.viii.48.

Native names. *Mende* (Ngoni); *ngusuka* (Misuku); *tiri* (Manganja and Nguru).

Type Locality. With regard to the locality "M'Khombuie, Angoniland," Loveridge suggested it was possibly a variant of Whyte's locality in the Misuku Mountains which has been spelled variously "Kombe, Kombi, and Kekombe," as in earlier days the Angoni ranged widely over the country. We appealed to Mr. C. W. Benson, the District Commissioner and ornithologist, who at one time or another has served in most of the area concerned. The gist of his reply, written on March 16, 1950, was as follows:

"I consider it most unlikely that 'M'Kombwe, Angoniland' is in the Misuku Mountains. There are certainly no Angoni there today and I do not think they ever penetrated the Misuku, even though it is known that the ancestors of the Angoni now living in Mzimba District did go as far north as the south end of Lake Tanganyika. I have read much of the early history of what is now the Karonga District and though the Angoni did visit the Karonga lake littoral there is no record of them entering the Misuku country. Furthermore, travellers and collectors in Nyasaland in the nineties of the last century and the first decade of the present one would never have referred to the Misuku area as in Angoniland.

"There are two Angonilands in Nyasaland:— (a) North Angoniland, consisting chiefly of all the Vipya country as far north as Njakwa, and as far south as about 12°45′. (b) South Angoniland embracing the greater part of the Dedza and Ncheu Districts. I have been enquiring in Dedza and find there is a Kombe village about 15 miles N.N.E. of Dedza boma at an altitude of 5,000 feet. There is also a Khombe village near the shore of Lake Nyasa, about 25 miles N.E. of Dedza

boma and 1600 feet a.s.l. Both villages are said to have been already settled in approximately these positions by 1900."

Discussion. In 1906 Wroughton described two races of *Otomys* from Nyasaland, *irroratus angoniensis*, a southern form from M'Kombhuie, Angoniland (see the above discussion of the type locality), and *i. nyikae*, a northern one from the Nyika Plateau. He gave as diagnostic characters of the latter the "extraordinary broad, flat, spatulate nasals," differentiating it further on the basis of its shorter hind foot and smaller bullae. Dollman (1915a, p. 165) further says that *nyikae* is a rather smaller animal, and gives each specific rank, although he believes them to be closely related, and indicates that the ranges are not overlapping. Of our series, the smallest is a specimen from Lichenya Plateau at the extreme south, the largest a near topotype of *nyikae* from the lower slopes of that mountain, while specimens from Zomba in the south resemble most closely those from the Misuku Mountains in the north. Zomba and Lichenya are rather close together geographically. The former, according to Dollman (1915a, p. 163), is within the range of typical *angoniensis*.

The largest of our series from Zomba, an old individual with strongly ridged skull, agrees closely with Wroughton's description and Dollman's (1915a, p. 163) further account of the type. It differs only in its slightly smaller size, length of skull 40.8 mm. instead of 42.0 mm., and shorter nasals, 17.7 mm. long and 8.9 mm. wide as against 19.7 mm. long and 8.9 mm. wide. The specimen from Nyika is even closer to *angoniensis* in cranial measurements with the large hindfeet of this form. The nasals, although broader than in *angoniensis*, being 9.6 mm. wide, are strongly inflated on each side of the mid-line, instead of flattened as described for *nyikae*, and the bullae are not significantly smaller than those of our southern specimens. The broken skull of an *Otomys* from the near-by Vipya Plateau is almost as large with slightly narrower, but otherwise similar, nasals. Width and inflation of the nasals increases tremendously with age in these *Otomys*. The parietal ridges develop early so that young skulls have a deceptively full grown appearance. Of our series of fourteen adults three have probably reached maximum size and resemble each other as noted above. Comparing the others within their age group, such differences as were found were very slight and cut across any division into northern and southern races.

Apparently we are dealing with a widespread species which tends to form well defined local populations and in which adjacent populations

often differ more from each other than they do from more distant groups. In this connection it is interesting to note that two specimens from the Uzungwe Mountains (Allen & Loveridge, 1933, p. 119) resemble a series of *angoniensis classodon* from Nairobi more closely than they do typical *angoniensis*. The point is further illustrated by the apparently random, but not overlapping, distribution of *angoniensis classodon* and *nyikae canescens* as plotted from identifications by Osgood, Hollister, Dollman and Allen. The type localities of these forms are within a very few miles of each other and the type series certainly show the characters described by Osgood. For this reason it has generally been assumed that two species of broad-nosed *Otomys* occur over the same general area in East Africa.

Enough material has now been accumulated to show that the situation is rather different. In series which I have examined from Molo, Lake Elementeita, Gilgil, Naivasha, Kijabe, Nairobi and the Fort Hall region, the supposed specific characters are overlapping. Further, comparison of long series from Kenya Colony with series from Nyasaland shows that all of the northern specimens resemble each other more closely than any of them resemble the southern ones. These latter tend to be somewhat smaller with proportionately shorter, broader rostra, and more heavily ridged skulls, while the shape of the nasals is conspicuously different. In old individuals of typical *angoniensis* the nasals are very broad and separately inflated with a median sulcus along the internasal suture. In the northern form they are narrower, tend to be domed in the mid-line at the point where the anterior portion is bent downward, and the internasal sulcus is usually absent.

Apparently, instead of having two species, *angoniensis* and *nyikae*, each with northern and southern races, there is a single very distinct species, *angoniensis*, with an as yet undeterminable number of races. This species differs from the *Anchotomys* and *jacksoni* groups, with which it shares some of its range, in a number of ways. Externally the harsher, rather coarsely streaked, fur is characteristic. Cranially the greater development of the rostrum is the most conspicuous feature. The incisors are heavy, the trumpet-shaped nasals broadly expanded, and the antorbital plate is wide. In profile the skull is deep dorsoventrally so that an extension of the alveolar margin falls below the bullae, and the development of the interorbital ridges gives it a slightly arched appearance.

BATHYERGIDAE

Cryptomys hottentotus whytei (Thomas)

Georychus whytei Thomas, 1897, Proc. Zool. Soc. London, p. 432: Karonga, Lake Nyasa, Nyasaland.

5 ♂♂, 2 ♀♀, 1 yng. (M.C.Z. 43797–802, 43814, 44245) Misuku Mtns. 1–13.x.48.

Native name. *Tunco* (Misuku).

Discussion. This series is very uniform in color. Compared with the specimens of *whytei* from the Rungwe and Poroto Mountains described by Allen and Loveridge (1933, p. 124) they average slightly darker on the ventral surface, and the degree of taper of the ends of the nasals is a little more variable. Otherwise these Misuku blesmols closely resemble those from the mountains to the north of Lake Nyasa.

Size. ♂. 152. 24. 24. 0 mm.; ♀. 145. 19. 22. 0 mm.

Breeding. On October 6 a nestling ♂ measured only 65. 8. 8. 0 mm.

Heliophobius argenteocinereus argenteocinereus Peters

Heliophobius argenteocinereus Peters, 1846, Ber. über Verhandl. K. Preuss. Akad. Wiss. Berlin, p. 259: Tete, Mozambique.

4 ♂♂ (M.C.Z. 43813, 43917–9) Mtimbuka. 14–28.ii.49.

Native name. *Uko* (Yao).

Discussion. This series from near Fort Johnston averages slightly smaller, both cranially and externally, than *angonicus*. Of three unbroken skulls, one has the relatively parallel-sided interorbital region (width across postorbital processes 8.7; interorbital width 8.2 mm.) said by Thomas (1895, p. 241) to be typical of *argenteocinereus*. The others have a more pronounced interorbital constriction, and are comparable in these dimensions to the narrowest of the Nchisi specimens (width across postorbital processes 9.9 and 9.5 mm.; interorbital width 7.6 and 7.8 mm.). The most striking external difference between the Mtimbuka series and *angonicus* is the uniformity in color of the former from young to old. Adult, young adult, and young are all represented, and all have the same rather long "fawn" colored tips to the hairs. In the case of the two youngest this is in sharp contrast to the slaty young of the higher altitude race, *angonicus*.

Rodney C. Wood found *Heliophobius* common in the hills near Cholo and Chiromo, and Kershaw (1922, p. 192) identified Wood's series as typical *argenteocinereus*. The series at hand, however, seems to show

that the Cholo animal is not separable from *angonicus*, but that a very distinct race does occur at Fort Johnston, to which the name *argenteocinereus* probably should be applied.

Size. ♂ (M.C.Z. 43917), 152. 14. 30. 0 mm.

Heliophobius argenteocinereus angonicus Thomas

Heliophobius angonicus Thomas, 1917, Ann. Mag. Nat. Hist. (8), **20**, p. 314: Bua River, Central Angoniland, Nyasaland (Moreau et al, 1946, p. 428).

3 ♀♀ (M.C.Z. 43795–6, 43815) Nyika Plateau. 9–17.xi.48.
5 yng. ♂♂, 12 ♀♀ (M.C.Z. 43784–94, 43816–21) Nchisi Mtn. 26.xi–13.xii.48.
♀ (M.C.Z. 43783) Zomba Plateau. 10.xi.48.
♂ (M.C.Z. 43812) Ruo R., Mlanje Mtn. 1.iv.49.
2 ♂♂, 4 ♀♀, 2 ? (M.C.Z. 43803–8, 43810–1) Cholo Mtn. 11–23.iii.49.

Native names. Fuko (Chewa; Ngoni; Nyanja); *namfuko* (Manganja at Cholo; definitely not *nanfuko* as given by Rodney Wood).

Discussion. Until Thomas described *angonicus*, specimens of *Heliophobius* from Nyasaland were generally considered identical with *argenteocinereus* from Tete. In 1917, Thomas separated the central Nyasa and northeastern Rhodesian form from *argenteocinereus* chiefly on the basis of its greater frontal breadth and the greater development of the postorbital processes. Our series from Nchisi Mtn. comes from slightly southeast of the type locality of *angonicus* and averages close to the measurements given by Thomas for this race. The largest has an interorbital breadth of 9.3 mm. and a breadth across the postorbital processes of 11.8 mm. as against 9.4 and 12.4 mm. in the type. Old individuals are, of course, broadest, while two young adults vary in interorbital breadth from 7.6 to 8.3 mm., and in breadth across the postorbital processes from 9.6 to 11.4 mm. Our series from the southern highlands are not appreciably narrower, and the width across the postorbital processes averages close to that of the Nchisi series. The largest specimen from Cholo has an interorbital breadth of 10.5 mm. and is 11.8 mm. across the postorbital processes.

Only one blesmol, an adult ♀ from Nchisi, has the vertical ridge on the occiput mentioned by Thomas as occurring in all three of his adult *angonicus*. This skull is further peculiar in that the root of the right incisor does not extend beyond the molar tooth row although the left is perfectly normal in this respect. The two oldest of the Nyika animals are remarkable in having only three molariform teeth in place in the upper jaw, fewer than in any of the more southerly specimens

of comparable age. The bullae also are slightly larger and project somewhat farther posteriorly than in the southern animals.

The palest of the Nchisi series has the tips of the hairs washed with "avellaneous", the darkest, with "fawn color." The range of variation is about the same for the Cholo series. Occasional individuals in each of the series have a white spot on the head, none has white markings on the belly. Young individuals from Nchisi and Cholo have rather plushy dark gray fur; in older ones the fur becomes silkier with brownish tips which are at first short and rather dark, then gradually become paler. A series of three individuals from the Nyika differs from the others in apparently retaining till a considerably older age the dark plushy fur usually characteristic of the young. Furthermore, two of the Nyika series have conspicuous, irregular, white blotches on the belly.

An adult skull of one of these with the locality label lost has no molariform teeth at all in the lower jaw, while those of the upper jaw are very long and curved outward so sharply that any chewing or grinding was done between the inner surface of the upper teeth and the toothless upper margin of the lower jaw. Of the ten that are in place, only the two first ones in each row are worn at the tips, indicating that at one time they were opposed by teeth in the lower jaw. The anteriormost on each side is thickly encrusted with a deposit which more than doubles its diameter at the tip.

Size. ♂ (M.C.Z. 43795), 160. 21. 31. 0 mm.; ♀ (M.C.Z. 43820), 180. 17. 35. 0 mm.

Parasites. The fur of a young Nchisi blesmol was swarming with mites (preserved).

Enemies. Fur, apparently of this species, was present in the stomach of a jackal (*Thos a. adustus*) shot on the Nyika. A blesmol was brought to our Likabula River camp but I refused to buy the poor creature as its front teeth had been broken off by the captor. Another native remarked that unless they were allowed to break the teeth the local people were so afraid of being bitten that they would not bring me these rodents. In many districts blesmols are eaten by the Africans.

LEPORIDAE

Lepus ?whytei Thomas

Lepus whytei Thomas, 1894, Proc. Zool. Soc. London, p. 142: Palombi River, Shirwa Plain, [i.e. Palombe River, Chilwa Plain], Nyasaland.

4 yng. (M.C.Z. 44123–6) near Tete, M. 10–24.i.49.

Native name. *Sulu* (Nyungwe).

Discussion. In the absence of adults these four leverets are only tentatively referred to this form, being too young for positive identification.

Size. ♂. 195. 30. 52. 44 mm.; ♀. 182. 40. 51. 50 mm.

PROCAVIIDAE

Heterohyrax syriacus manningi (Wroughton)

Procavia brucei manningi Wroughton, 1910, Ann. Mag. Nat. Hist. (8), **5**, p. 109: Mlanji, [i.e. Mlanje], Nyasaland.

♂ (M.C.Z. 44156) Chiradzulu Mtn. 27.viii.48.
yng. ♂ (M.C.Z. 44154) Cholo Mtn. 14.iii.49.
♀ (M.C.Z. 44155) Chambe Plateau. 20.viii.48.

Native names. *Mbela* (Chewa; Ngoni; Nyanja; Manganja).

Discussion. The topotype from Chambe Plateau, Mlanje Mtn., is smaller than Wroughton's two specimens but otherwise does not appear to differ. The young ♂ from Chiradzulu (in stage IV) shows the paler, browner color described for young animals of this species.

Size. ♂. 410. 0. 59. 30 mm.; ♀. 457. 0. 65. 30 mm.

Breeding. The ♀ held two fetuses (preserved) near birth.

Diet. Stomachs were crammed with green leaves.

Parasites. Surprisingly enough the stomachs appeared to be free of parasites, but lice and a tick were preserved from the topotype.

Habitat. The topotype was shot on the moss-grown rocks of a ravine deep in cedar forest rendered accessible by a path that had recently been cut for the removal of timber. A hundred yards away I shot a bigger hyrax which both guide and gunbearers declared was a larger species (? *Procavia j. johnstoni*, also described from Mlanje Mtn.). Unhappily it rolled down a sloping rock into a cavern from which it could not be recovered. At night, hyrax were frequently heard calling on Lichenya Plateau. They are said to occur on the precipitous rock-face of the escarpment below Chingwe's Hole on Zomba Mtn., a location where they are free from molestation by man.

SUIDAE

Potamochoerus porcus ?nyasae Major

Potamochoerus choeropotamus nyasae Major, 1897, Proc. Zool. Soc. London, p. 367, pl. xxv, fig. 3; pl. xxvi, fig. 4: Zomba, Nyasaland.

Skull only (M.C.Z. 44307) Nchisi Mtn. 1947.

2 yng. (M.C.Z. 43889–90) near Tete, M. 14–17.i.49.

Native name. *Kumba* (Nyungwe).

Discussion. The material is such that positive identification is not possible although the skull resembles rather closely Major's figure of *nyasae*.

Size. ♂ yng. 340. 115. 80. 58 mm.; ♀ yng. 350. 115. 80. 50 mm.

Habitat. The skull is from a specimen shot in Nchisi Forest by Guy Muldoon. A pair of fullgrown wild pigs appeared at dawn on the edge of Matipa Forest, Misuku Mountains, close to our camp.

BOVIDAE

Cephalophus harveyi harveyi Thomas

Cephalophus harveyi Thomas, 1893, Ann. Mag. Nat. Hist. (6), **11**, p. 48: Kahe Forest, s.e. foot Kilimanjaro Mtn., Tanganyika Territory.

♀ (M.C.Z. 44308) Nyika Plateau. 8.xi.48.

Discussion. This fine adult skin and skull confirm Miss St. Leger's (1936, p. 218) opinion as to the subspecific identity of the Nyasaland form. Her opinion was based on a skin without a skull from Nkata Bay, a locality slightly southeast of the Nyika Plateau from whence comes our animal.

Size. ♀. 800 ? (as body removed), 115. 190. 75 mm.

Sylvicapra grimmia altifrons (Peters)

Antilope altifrons Peters, 1852, Reise nach Mossambique, Säugeth., p. 184, pls. xxxvii–xxxviii: Boror and Sena, Mozambique.

Antilope ocularis Peters, 1852, Reise nach Mossambique, Säugeth., p. 186, pl. xxxix; pl. xli, fig. 1; pl. xlii, fig. 1: Boror; Macanga; Sena; and Tete, Mozambique.

♀ (M.C.Z. 44314) Nyika Plateau. 1.xi.48.
2 ♂♂, 1 ♀ (M.C.Z. 44310–1, –13) Nchisi Mtn. 27.xi.–3.xii.48.
♀ (M.C.Z. 44312) Chitala River. 16.xii.48.
1 yng. ♂, 2 yng. ♀ ♀ (M.C.Z. 43885–7) near Tete, M. 6–26.i.49.

Native names. *Insha* (Chewa); *ngwapi* (Ngoni); *nyasa* (Nyungwe).

Discussion. This series clearly belongs to the southern long-eared section of *grimmia*, not to the short-eared section represented by *shirensis*. We have followed Wroughton (1910, p. 274) in considering the Nyasaland form to be the same as that from Tete. The Nchisi animals differ from the others in having more conspicuous white markings around the eyes and the bases of the ears. Further, one of them, although otherwise indistinguishable from the rest, has very

much larger bullae: length from top of meatus to bottom of bulla 35.5 mm. as against 30.3 and 30.5 mm. The external ear measurements are respectively 110, 110 and 118 mm. The three juvenile topotypes of *ocularis* are too young to show adult characters.

Size. ♂. 950. 130. 245. 118 mm.; ♀ (M.C.Z. 44314), 1010. 135. 250. 110 mm.; ♂ yng. 490. 80. 170. 88 mm.; ♀ yng. 470. 60. 167. 90 mm.

Breeding. On December 16 a ♀ held a large fetus.

Parasites. Nematodes (*Setaria* sp.) were preserved from stomachs of two Nchisi duiker.

Oreotragus oreotragus centralis Hinton

Oreotragus oreotragus centralis Hinton, 1921, Ann. Mag. Nat. Hist. (9), **8**, p. 131: South Chinsali district, northeastern Rhodesia.

♂ (M.C.Z. 44293) 15 miles NW. of Fort Hill.

Discussion. The bright ochraceous coloring of the anterior parts contrasts strongly with the gray rump and thighs. On the shoulders, and the sides immediately behind the shoulders, the color is deepest, and is further accentuated by the absence of well-defined, subterminal, black rings on the hairs. In front of the eyes are patches of white-based, buffy-tipped hairs which contrast with the rest of the face and suggest the conspicuous white preorbital patches which are characteristic of the more easterly race *acratos*, and lacking in *centralis*.

Remarks. This museum skin was presented by C. W. Benson, Esq. as Loveridge met with klipspringers only on the rock-strewn sides of Nchisi Mountain, and failed to secure any.

Raphicerus sharpei ?sharpei Thomas

Raphiceros sharpei Thomas, 1897, Proc. Zool. Soc. London, for 1896, p. 796, pl. xxxix: Southern Angoniland, Nyasaland.

yng. (M.C.Z. 44292) Nthalire, Karonga District. 27.iv.47.
yng. ♀ (M.C.Z. 43888) near Tete, M. 6.i.49.

Native name. Kasenyi (Nyungwe).

Discussion. Both of these steinbok probably belong to this race although they are too young for positive identification, and the dark marking on the head is more extensive than described and figured by Thomas in the type.

Size. juv. ♀. 460. 40. 140. 78 mm.

Remarks. The Nthalire specimen was presented by C. W. Benson,

Esq., while the other was brought in alive, indicating that the young are dropped in Zambezia in early January.

Redunca arundinum arundinum (Boddaert)

Antilope arundinum Boddaert, 1785, Elenchus Animalium, p. 141: Cape of Good Hope.

♀ & fetal ♀ (M.C.Z. 44294, 44309) Vipya Plateau. 18.ix.48.

Native names. Mpoyo (Timbuka); *shangu* (Ngoni).

Discussion. The adult is rather more strongly fulvous than the average of our series of this race from southern Tanganyika and the Transvaal.

Size. ♀. 1550. 270. 400. 163 mm.; fetal ♀. 540. 100. 210. 80 mm.

Breeding. The gravid ♀ was shot from a party of three does accompanying a buck. On the Nyika only solitary reedbuck were seen in November and they were uncommon and excessively timid.

Strepsiceros strepsiceros strepsiceros (Pallas)

Antilope strepsiceros Pallas, 1766, Miscellanea Zool., p. 9; 1767, Spicilegia Zool., pt. 1, p. 17; 1777, pt. 12, pp. 19, 67: Cape of Good Hope.

♀ (M.C.Z. 44306) near Tete, M. 20.i.49.

Native name. Ngoma (Nyungwe).

Discussion. This adult ♀ clearly belongs to the typical southern subspecies rather than to the grayer race *frommi* of southern Tanganyika.

Size. ♀. 1300. 360. 500. 222 mm.

Habitat. Not infrequently we came on fairly fresh spoor of small parties of Greater Kudu in the low hills to the south of Kasumbadedza. Apparently it was one of these animals that had been harried by a native huntsman and his dogs and driven into the Zambezi. She was a third of the way across when I first saw her swimming strongly despite the current and the sinister snouts of several watchful crocodiles. Later, followed by three crocodiles, she returned to shallow water but was prevented from landing on Mwanza rocks by the vociferously barking collection of curs gathered on the narrow foreshore. She was killed instantly with a bullet through the brain.

Tragelaphus scriptus ornatus Pocock

Tragelaphus scriptus ornatus Pocock, 1900, Ann. Mag. Nat. Hist. (7), **5**, p. 94: Linyante, swamps of the Chobi, between Lake Ngami and the Zambezi, northern Bechuanaland.

♀ (M.C.Z. 44315) Lichenya Plateau. 9.viii.48.

Native name. *Mbawala* (Chewa; Ngoni; Nyanja; Yao).

Discussion. This specimen differs from *s. massaicus* to the north by its brighter, richer coloring, more numerous spots on the flanks and along the belly, and in the presence of eight obsolescent transverse stripes.

Size. ♀. 1180. 95. 290. 115 mm.

Breeding. She held a fetus (preserved) measuring about 105. 14. 45. ? 25 mm.

Remarks. This bushbuck was shot at the edge of a large coppice at 7:00 A.M. When we went to pick her up there was a noise in the bushes thirty feet away as if another animal was making off. At noon we disturbed a pair feeding on the outskirts of a patch of closed forest beyond Chingwe's Hole, Zomba Plateau.

Taurotragus oryx livingstonii (Sclater)

Oreas livingstonii P. L. Sclater, 1864, Proc. Zool. Soc. London, p. 105: Left bank of the Zambezi near the Kafue, Rhodesia.

♀ (M.C.Z. 44303) Nyika Plateau. 11.xi.48.

Native name. *Nchefu* (Ngoni).

Size. ♀. 2800. 620. 520. 160 mm.

Parasites. Bots from the stomach were preserved.

Habits. This fine animal was leading a herd of about 25 eland in which there were two bulls. The day before I had sighted a herd numbering about 80 or 85 animals, irrespective of a dozen zebras which seem to accompany every herd of eland on the plateau. Doubtless the eland derive additional protection from the zebras' habit of grazing along the skyline.

EQUIDAE

Equus burchelli crawshaii de Winton

Equus burchelli crawshaii de Winton, 1896, Ann. Mag. Nat. Hist. (6), **17**, p. 319: Henga, highlands west of Lake Nyasa, Nyasaland.

♂ ♀ (M.C.Z. 44304–5) Henga Highlands, Nyika Plateau. 3 & 9.xi.48.

Native name. *Mbidzi* (Ngoni).

Discussion. Cabrera (1936), in his excellent review of the Burchell zebras, discusses in detail the tremendous amount of individual variation in this group and concludes that only four of the many described forms represent valid races. He further makes *crawshaii*, of which our two specimens are topotypical, a synonym of the East African form *böhmi*, stating in part:

> "specimens mentioned under that name [*crawshaii*] in some cases are identical with the latter form [*böhmi*], and in others belong to the narrow-striped Zambesian race for which *selousi* seems to be the valid name."

Antonius (1951, p. 21) follows him in considering *crawshaii* to be a synonym of *böhmi* but recognizes *foai* Prazak and Trouessart from the lower Zambezi as a distinct race, intervening between *selousi* in the south and *böhmi* in the north.

The pair of topotypes at hand show the situation to be somewhat different. As Miss St. Leger (1932b, p. 590) supposed, the northern Nyasaland zebra is not the same as the East African *böhmi*, the numerous narrow stripes in our Henga specimens show that it is more closely related to *selousi*. Supposing Antonius is correct in assuming the distinctness of a Zambesian race, our material is inadequate to show whether it differs from *crawshaii*. The evidence suggests that the two are the same, in which case *crawshaii*, 1896 takes precedence over *foai*, 1899.

Size. ♂. 2400. 450. 430. 190 mm.; ♀. 2410. 400. 425. 180 mm.

Breeding. On November 9 a well-grown foal was running with the two mares accompanying the stallion when he was shot. Two days later a lone roan antelope (which I had frequently seen on the plateau) attached himself to the little party and remained with them for at least a week.

Parasites. Some worms (*Cylicocercus alveatus; Cylicoeylus insignis;* and *Cylindropharynx* sp., probably *intermedia*) were identified by Dr. J. T. Lucker.

Habitat. Crawshay's zebras were not plentiful, but by no means uncommon, on the corner of the Nyika Plateau on which we were camping. Small parties of zebra accompanied the wandering herds of eland while others seemed to keep much to themselves; all were remarkably wary.

BIBLIOGRAPHY

of papers referred to in the text

Allen, G. M.

1939. "A Checklist of African Mammals." Bull. Mus. Comp. Zool., **83**, pp. 1–763.

Allen, G. M. and B. Lawrence

1936. "Scientific Results of an Expedition to Rain Forest Regions in Eastern Africa. III. Mammals." Bull. Mus. Comp. Zool., **79**, pp. 29–126, pls. i–v.

Allen, G. M. and A. Loveridge

1927. "Mammals from the Uluguru and Usambara Mountains, Tanganyika Territory." Proc. Boston Soc. Nat. Hist., **38**, pp. 413–441.

1933. "Reports on the Scientific Results of an Expedition to the Southwestern Highlands of Tanganyika Territory. II. Mammals." Bull. Mus. Comp. Zool., **75**, pp. 45–144, pl. i.

1942. "Scientific Results of a Fourth Expedition to Forested Areas in East and Central Africa. I. Mammals." Bull. Mus. Comp. Zool., **89**, pp. 145–216, pls. i–v.

Antonius, Otto

1951. "Die Tigerpferde. Die Zebras." Monographien der Wildsäugetiere (Frankfurt/ Main). **11**, pp. 3–148, tbls. 1–4, pls. i-xlvi.

Cabrera, Angel

1936. "Subspecific and individual Variation in the Burchell Zebras." Journ. Mammalogy, **17**, pp. 89–112, figs. 1–21, map.

Dollman, Guy

1910. "Two New African Mammals." Ann. Mag. Nat. Hist. (8), **6**, pp. 226–230.

1915a. "On the Swamp-Rats (*Otomys*) of East Africa." Ann. Mag. Nat. Hist. (8), **15**, pp. 149–170.

1915b. "On the African Shrews belonging to the genus *Crocidura*." Ann. Mag. Nat. Hist. (8), **15**, pp. 507–527.

Ellerman, J. R. with R. W. Hayman and G. W. C. Holt

1941. "The Families and Genera of Living Rodents. Volume II." London, pp. xii + 690, figs. 1–50.

Hollister, Ned

1919. "East African Mammals in the United States National Museum. Part II". Bull. U. S. Nat. Mus., **99**, pp. x + 184, fig. 1, pls. 1–44.

Johnston, Sir Harry

1897. "British Central Africa; an attempt to give some account of a portion of the territories under British influence north of the Zambezi." (London). pp. 1–544, figs. 1–223, maps 1–6.

KERSHAW, P. S.

1922. "On a Collection of Mammals from Chiromo and Cholo, Ruo, Nyasaland, made by Mr. Rodney C. Wood with Field Notes by the Collector." Ann. Mag. Nat. Hist. (9), **10**, pp. 177–192.

LAWRENCE, BARBARA

1945. "Notes on *Leggada musculoides* (Temminck)." Proc. New Eng. Zool. Club, **23**, pp. 85–98.

LAWRENCE, B. and S. L. WASHBURN

1936. "A new Eastern Race of *Galago demidovii*." Occ. Pap. Boston Soc. Nat. Hist., **8**, pp. 255–266.

MOREAU, R. E., G. H. E. HOPKINS and R. W. HAYMAN

1946. "The Type Localities of some African Animals." Proc. Zool. Soc. London, **115**, pp. 387–447.

OSGOOD, WILFRED H.

1910. "Diagnoses of New East African Mammals, Including a New Genus of Muridae." Field Mus. Nat. Hist., Zool. Ser., **10**, pp. 5–13.

PETERS, W. C. H.

1852. "Naturwissenschaftliche Reise nach Mossambique, Zool. **1**, Säugethiere." (Berlin). pp. xvi + 202, pls. i–xliv.

POCOCK, R. I.

1932. "The Leopards of Africa." Proc. Zool. Soc. London, pp. 543–591, figs. 1–9, pls. i–iv.

1944. "The Wild Cat (*Felis lybica*) of northern Benguella, Angola." Ann. Mag. Nat. Hist. (11), **11**, pp. 130–133.

RIDGWAY, ROBERT

1912. "Color Standards and Color Nomenclature." (Washington). pp. iv + 44, col. pls. i–liii.

ST. LEGER, JANE

1932a. "On Mammals from North-West Damaraland, South-West Africa, obtained during Captain Shortridge's Sixth Percy Sladen and Kaffrarian Museum Expedition." Proc. Zool. Soc. London, pp. 957–974, pl. i.

1932b. "On *Equus quagga* of South-western and Eastern Africa." Ann. Mag. Nat. Hist. (10), **10**, pp. 587–597.

1936. "A Key to the Species and Subspecies of the Subgenus *Cephalophus*." Proc. Zool. Soc. London, pp. 209–228.

Schwarz, Ernst

1926. "Die Meerkatzen der *Cercopithecus aethiops*-Gruppe." Zeitschr. f. Säugetierkunde, **1**, pp. 28–47.

1931. "On the African Long-tailed Lemurs or Galagos." Ann. Mag. Nat. Hist. (10), **7**, pp. 41–66.

Swynnerton, G. H.

1945. "A Revision of the Type-localities of Mammals occurring in the Tanganyika Territory." Proc. Zool. Soc. London, **115**, pp. 49–84.

Thomas, Oldfield

1895. "On African Mole-rats of the Genera *Georychus* and *Myoscalops*." Ann. Mag. Nat. Hist. (6), **16**, pp. 239–241.

1897a. "New African Mammals." Proc. Zool. Soc. London, pp. 430–436.

1897b. "On the Mammals obtained by Mr. A. Whyte in Nyasaland, and presented to the British Museum by Sir H. H. Johnston, K.C.B., being a fifth contribution to the Mammal-fauna of Nyasaland." Proc. Zool. Soc. London, pp. 925–939, pl. liv.

1918. "A Revised Classification of the Otomyinae, with Descriptions of new Genera and Species. Ann. Mag. Nat. Hist. (9), **2**, pp. 203–211.

Thomas, O. and R. C. Wroughton

1908. "1. The Rudd Exploration of S. Africa.—X. List of Mammals collected by Mr. Grant near Tette, Zambesia." Proc. Zool. Soc. London, pp. 535–552.

Wroughton, R. C.

1906. "Notes on the Genus *Otomys*." Ann. Mag. Nat. Hist. (7), **18**, pp. 264–278.

1910. "Two new Duikers related to *Cephalophus abyssinicus* and a new *Dendromus* from Mt. Elgon." Ann. Mag. Nat. Hist. (8), **5**, pp. 273–275.